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ABSTRACT

A study investigated whether adult anglophone readers of French could be taught to use the organizational patterns (top-level structures, or TLSs) in expository text and whether they could then use this knowledge (the structure strategy) to facilitate reading comprehension as measured quantitatively through immediate free recall. Subjects were 43 university students of high intermediate level French proficiency divided into experimental (n=21) and control (n=22) groups. The experimental group received training in the use of five TLSs: description; sequence; causation; problem solution; and comparison. Training concentrated on use of the TLSs and their corresponding signal words as strategy for promoting recall. All subjects were pre- and posttested for reading comprehension and recall. Subjects also completed rating scales to estimate text difficulty, memorability, affect, interest, background knowledge, clarity of argument, organization, recommendations, content, and discussion of content. Results indicate that: text topic was a significant factor in recall, suggesting that effects of training in structure strategy cannot be predicted across topics; more proficient readers appeared to have the structure strategy already, and those trained in it had improved recall; structure strategy is teachable; reading time was not significantly related to recall; and longer passages seemed to offer no disadvantages. (MSE)

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CENTRE INTERNATIONAL DE RECHERCHE EN AMÉNAGEMENT LINGUISTIQUE
INTERNATIONAL CENTER FOR RESEARCH ON LANGUAGE PLANNING

The Effects of Structure Strategy Training on the Recall of Expository Prose for University Students Reading French as a Second Language

Patricia M. Raymond

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Abstract / Résumé

The present study was designed to investigate whether adult anglophone readers of French (N= 43) could be taught to use the organisational patterns (top-level structures) in expository text and whether they could then use this knowledge (the structure strategy) to facilitate reading comprehension as measured quantitatively through immediate free recall. Main effects were obtained for group (p. ≤.05). Text topic was significant (p <.001) and significant differences were also obtained for text difficulty, interest and content. The use of the structure strategy depends to a large extent on text content.

L'objet de cette recherche était de vérifier les effets de l'enseignement de la stratégie du plan sur la performance en lecture en français langue seconde. Ce qui nous intéressait plus particulièrement était de voir si cet enseignement permettait d'augmenter la quantité d'information rappelée après la lecture de textes informatifs. Nous avons obtenu des résultats significatifs pour le groupe (p ≤.05) et pour les deux textes (p <.001) utilisés lors de l'expérimentation. Nous avons également obtenu des résultats significatifs concernant la difficulté, l'intérêt et le contenu de ces textes. L'utilisation de la stratégie du plan dépend donc en grande partie de la variable texte.

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Chapter I

The Problem

The study of the organizational patterning of discourse has drawn the attention of theoreticians and researchers among several disciplines including scholars in the field of rhetoric (Faigley & Meyer, 1983; Olson, Mack & Duffy, 1984) of cognitive psychology (Kintsch & van Dijk, 1978, 1983) and of linguistics (Grimes, 1975; Meyer, 1975a). In these fields, researchers in both first and second languages are interested in what makes for cohesive discourse (Halliday & Hasan, 1976) in what dimensions serve to differentiate texts (Grimes, 1975; van Dijk & Kintsch, 1983; Meyer, 1975a) and in what strategies readers could use to process them (Block, 1986; Hosenfeld, 1977; Meyer & Rice, 1984; Olshavsky, 1977; Reiss, 1985; Sarig, 1987).

To date, the study of the organizational patterning in discourse has emphasized both narrative text (Mandler & Johnson, 1977; Stein & Glenn, 1979) and non narrative or expository text (Deschênes, 1988, pp. 20+114). But expository text more closely resembles texts used in formal learning situations and research using it could be transferable to these situations. Further, work on expository text could furnish indications as to how such texts should be written which could improve classroom materials (Deschênes, 1988).

There is much interest in the way first language readers process the organizational patterns in discourse. Grimes' (1975) theoretical descriptions of rhetorical patterns (rhetorical predicates) have been expanded and experimented with by Meyer (1975a). Kintsch and van Dijk's concept of macrostructure (1978, 1983) has been experimentally validated (Guindon & Kintsch, 1985). Through experimentation, a distinction has grown between form (rhetorical predicates) and content (macrostructure) in the research on discourse structure.

As yet, there is little basic knowledge available as to what these readers know about particular organizational patterns nor when these readers become aware of them (Horowitz, 1985, p. 535). There has been some experimentation with reference to age related developmental trends (Olhausen & Roller, 1988). For example, McGee (1982a) has shown that a majority of fifth grade good readers (*N*=20) used full text structure to organize their oral recalls of expository prose. But for third grade good readers, the majority had no text structure in their oral recall of a descriptive, 125 word passage. McGee (1982b) has also shown that when writing compositions (composition protocols) after reading a passage or simply recalling a passage, more sixth graders tended not to use a particular text organizational pattern, that ninth graders tended to use a less developed text organizational pattern and that adults used more fully developed text organizational patterns. Although these age related trends deserve careful attention and more research, they are beyond the scope of the present study.[1] There has also been some training research in reading with particular rhetorical predicates (Bartlett, 1978; Brooks & Dansereau, 1983; Slater, Graves & Piché, 1985).

In foreign (and second language) research, there exist several studies investigating the ways in which adult native German readers (Wolff, 1987), native Israeli readers (Levine & Reves, 1985; Sarig, 1987), native Japanese readers (Connor, 1984) and native Arabic, Korean, Chinese, Malaysian and Indonesian readers (Carrell, 1984, 1985; Martin, 1981) process select organizational patterns in reading English. Studies investigating the ways in which native English readers process select organizational patterns in reading French as a foreign language either concentrate on the relative importance of semantic or syntactic knowledge (Barnett, 1986) or fall short of investigating these patterns due to unclear statements of what such patterns are (Allen, Bernhardt, Berry & Demel, 1988). In Canada, with its federally funded programs of Français Langue Seconde instruction, there is a felt need for studies examining the ways in which readers of French as a second language process select organizational patterns.

---

[1] The researcher is presently investigating age related developmental trends in the use of TLS's for Francophone 9 and 10 year olds.

Purpose of the Study

The present study is designed to examine the effects of training in select organizational patterns on the reading recall of university level anglophones reading well structured, expository texts in French as a second language.

Definitions of Terms

Exposition

The texts used in this research are exposition inasmuch as they are based primarily on abstract, logical relations and on mostly scientific topics. Grabe (1987) found that there is a general text type which may be labeled *expository* as opposed to *non expository* texts such as narratives. He hypothesized 15 possible text-type groupings including texts from academic journals, from introductory college textbooks, from general audience popular journals, and so on. He then collected 10 texts from each grouping and compared them by means of syntactic measures for example, past and present tenses, relative clauses and cohesion measures such as definite article reference and repetition. He used factor analysis to combine variables that co occurred in these texts. His results suggest that there is a text genre called expository prose (p. 128) and that a number of text type distinctions exist within it. He further suggests that writers deliberately exploit these distinctions and that readers, in turn, must be able to recognize them.

Faigley and Meyer (1983) investigated the cognitive basis for the classification of various rhetorical patterns. They used two groups of university subjects, one (*n*=17) with high knowledge of such patterns and one (*n*=17) with no knowledge of such patterns. There were three separate studies. In study one, in which subject matter was not controlled, high knowledge and low knowledge subjects were asked to group 16, 100 word texts of eight text types: definition, classification, comparison, narration, description, process, cause effect and evaluation. Both groups of subjects grouped these texts similarly. In study two, in which subject matter was the same for all texts, both high knowledge and low knowledge subjects were required to group five text types: description, process, classification, narration and definition. Again, all subjects grouped these texts in a similar fashion. In study three, in which texts were selected from the middle paragraphs of 24 essays, consistent groupings still resulted for certain texts. This led Faigley and Meyer to believe that such rhetorical patterns have some cognitive basis.

All texts for the training in this study were selected from magazines, newspapers and periodicals and as such were not specifically written for second language learners.

Top Level Structure

Grimes (1975) defined rhetorical predicates as those which connect sentences and paragraphs and lend prose its overall organization and form. This global form is thought to be largely independent of content (van Dijk, 1981, p. 76; Kintsch & Yarbrough, 1982; Meyer, 1977a; Meyer, Britton, Glynn & Penland, 1982; Olhausen & Roller, 1988, p. 72) and has been treated in the literature under a variety of terms, namely superstructure in van Dijk (1981) and Kintsch and van Dijk (1978, 1983) formal schemata in Carrell (1984, 1985) and Connor (1984), structural schemata in Brooks and Dansereau (1983) and top level structure in Meyer (1975a). The term top level structure (TLS) will be used in this study. It refers to the rhetorical relationship that subsumes the greatest amount of text.

Five TLS's have been selected for the present study due to their frequency of occurrence in prose (Meyer, 1975a; Meyer & Rice, 1982). They are:

(a) DESCRIPTION: a TLS which presents a topic and gives more information about it through attributes, specifics, explanations or settings.

(b) COLLECTION: a TLS which presents a list of elements associated in some manner. This listing becomes more organized when it is sequenced in some way as for example in time. The structures of collection and description often combine when a number (collection) of attributes, specifics or settings are given about a topic. This is termed a collection of descriptions.

(c) CAUSATION (or covariance): a TLS which presents a causal relation between topics, as well as relationships in time; one idea is the antecedent or cause and the other is the consequent or effect.

(d) RESPONSE (problem-solution or remark-reply or question-answer): a TLS which presents a problem and its solution(s); it includes all of the organizational components of causation; in addition, there is overlap between the problem and the solution, that is, one part of the solution must match an aspect of the problem.

(e) COMPARISON: a TLS which points out the differences or similarities between two or more topics; it can take three forms: analogy, alternative and adversative. Analogy seems self explanatory. An alternative form presents equally weighted but opposing positions. An adversative form presents unequally weighted opposing viewpoints (Meyer 1981, p. 13; Meyer, 1982a, p. 64; Meyer, Brandt & Bluth, 1980, p. 74; Meyer & Freedle, 1984, p. 121; Meyer & Rice, 1982, p. 157 and 1984, pp. 326-327).[2]

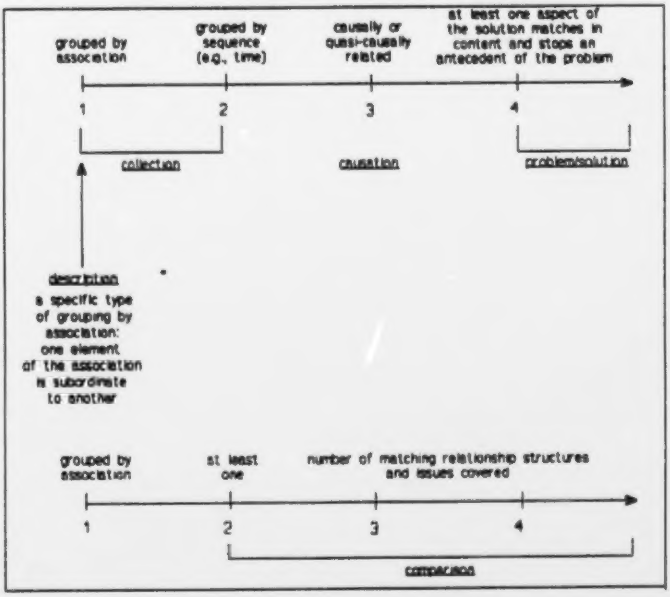
Figure 1 (Meyer & Freedle, 1984, p. 123) demonstrates the cumulative nature of these five TLS's.

---

[2] Grimes' original list of 18 rhetorical predicates was reclassified by Meyer (1975a) into the five TLS's given here. These five were later chunked into three groups: a) collection causation response b) comparison and c) description. See Meyer 1985, p. 270 for details.

FIGURE 1

Type and number of specified organizational components required for the different discourse types


grouped by association
grouped by sequence (e.g., time)
causally or quasi-causally related
at least one aspect of the solution matches in content and stops an antecedent of the problem
1
2
3
4
collection
causation
problem/solution
description
a specific type of grouping by association: one element of the association is subordinate to another
grouped by association
at least one
number of matching relationship structures and issues covered
1
2
3
4
comparison

As one moves from description to problem solution on this scale, the number of relationships increases. For example, description has the least number and problem solution has the most. Note that the comparison TLS is on a separate scale. With this scale, Meyer and Freedle imply that description would be the most difficult to recognize because it has the fewest relationships whereas problem solution has the most and would be easier to recognize.

Signal Words

The above TLS's are foregrounded by signals[3] which function as signposts for each of them. A signal is defined as a word or phrase in a text that does not add new content to a topic but which gives emphasis to certain aspects of the semantic content or points out aspects of the structure of the content (Meyer et al. 1982, p. 57). There are four types of signals. The first type cues (by means of words or phrases) relations that exist among text ideas. These are explicitly stated. For example, a causation TLS would be cued by words such as *therefore* and *consequently*; a comparison TLS, by *likewise* and *similarly* ; a collection TLS, by *in addition to*; and a description TLS, by *in particular* and *for instance*. It is this first type of signal, hereafter termed ***signal words***, which is of prime concern in the present research.[4]

---

[3] Meyer has borrowed the term and concept of 'signaling' from Grimes' *The Thread of Discourse*, 1975, Mouton, the Hague.

Title words and/or headings constitute a second type of signal. They are, in fact, previews of what is to come in the text and are considered to be prematurely revealed information. Enumerating topics at the beginning of a text is another way to present information before its detailed discussion in a text. The third type summarizes (by means of a concluding sentence, for example) information that was presented earlier in a text (Meyer, 1975a, p. 78). The last type of signal identifies the most important ideas in a text through phrases such as *an important point is* and *it should be noted that*. These phrases inform the reader as to the author's perspective of a particular idea. In this way, the four types of signaling can clarify both the hierarchical and some semantic relationships within text.

Meyer (1975a) has argued that signaling and TLS's do not add new content, but make the information already contained in a passage more explicit. Table I (Meyer, 1982b, p. 78) lists the five basic TLS's and signal words (of the first type above) that can be used by writers to alert readers to these TLS's. TLS's may be viewed as signals that explicitly illustrate a writer's perspective on the content of a text.

---

[4] This first type of signal corresponds to Halliday and Hasan's cohesive tie of conjunction. See *Cohesion in English*, 1976, Longman. Conjunction includes four kinds of cohesive conjunctions: additive (also, likewise), adversative (however, on the other hand), causal (as a result, consequently) and temporal (next, finally).

TABLE I
Five Basic Writing Plans and Their Signal Words

Writing Plan		**Signal**
Collection	– grouping	and, in addition, also, include, moreover, besides, first, second, third, fourth, etc., subsequent, furthermore, at the same time, another
	– sequence	before, after, soon, more recently, afterwards, later, finally, last, early, following, to begin with, to start with, then, as time passed, continuing on, to end, years ago, in the first place
Description		for example, which was one, this particular, for instance, specifically, such as, attributes of, that is, namely, properties of, characteristics are, qualities are, marks of, describing
Causation		as a result, because, since, for the purpose of, caused, led to, consequent, thus, in order to, this is why, if/then, the reason, so, in explanation, therefore
Problem/solution		PROBLEM: problem, question, perplexity, puzzle, enigma, riddle, issue, query, need, to prevent, the trouble
		SOLUTION: solution, answer, response, reply, rejoinder, return, comeback, to satisfy the problem, to set the issue at rest, to solve these problems
Comparison		not everyone, but, in contrast, all but, instead, act like, however, in comparison, on the one hand, on the other hand, whereas, in opposition, unlike, alike, have in common, share, resemble, the same as, difference, differentiate, compared to, while although

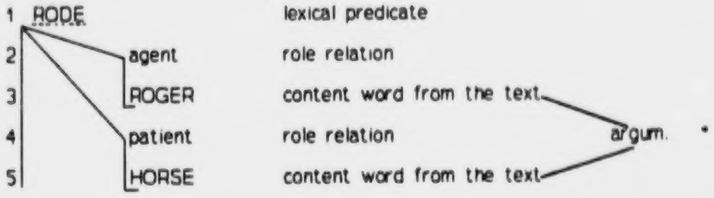
Content Structure

The term content structure was introduced by Grimes (1975) to refer to a hierarchically arranged display of a passage's content. The content structure shows the pattern of organization of the content of the passage, illustrates how some ideas are superordinate and others subordinate and includes labels to classify relationships within the content. These labels are of two types: *role* relations and *rhetorical* relations. The former classify the way in which lexical predicates relate to their arguments (e.g. agent, patient, force etc. as outlined by Fillmore (1968)), and the latter relate larger segments of text than sentences. Rhetorical relations contain rhetorical predicates and their arguments (see Appendix A for the two texts and their content structure as used in this research). It is this structure of text that primarily differentiates it from simple lists of words or sentences.

Idea Units

The term idea unit refers to both the content units (role relations or the actual information in a text) and the relationship units (rhetorical relations or labels for identifying relationships between units of meaning) of a content structure of prose as defined by Grimes (1975) and Meyer (1975a). For example, a simple sentence such as ROGER RODE THE HORSE is a content unit or a lexical proposition. It contains a lexical predicate and its arguments. The lexical predicate is RODE which is related to its arguments ROGER and HORSE. ROGER is related to its lexical predicate RODE by an agent role. RODE is related to its other argument, HORSE, by a patient role.

Role relationships specify relationships within clauses and simple sentences. The content structure of this lexical proposition is diagrammed as follows:



The numbers on the left refer to idea units. Thus, there are five idea units. The lexical predicate is underlined with broken lines.

A relationship unit or rhetorical proposition contains a rhetorical predicate and its arguments. A rhetorical relation can be used to relate sentences and/or larger segments of text than sentences. For the sentence THE WIDE VARIETY IN THE COLOR OF PARAKEETS RESULTED FROM BREEDING OF COLOR MUTANT OFFSPRING, the following content structure is obtained (Meyer, 1975b, p. 28):

1	Result, covariance, consequent	rhet. rel.
2	WIDE VARIETY OF COLOR OF PARAKEETS	content wd
3	covariance, antecedent	rhet. rel.
4	BRED	content wd
5	patient	role rel.
6	OFFSPRING	content wd
7	description attribution	rhet. rel.
8	COLOR MUTANT	content wd

There are eight idea units above. The rhetorical relationships are underlined in the content structure.

When deriving the content structure of a given passage, a tree like structure with nodes (lexical predicates) connected by a series of labeled lines (rhetorical predicates) is formed. In this tree like structure, the TLS appears in the left most position (level one) with subordinate information appearing to the right and downward (levels two to eight) (see Appendix A for all of the idea units in the content structure of the texts used in this study).

Immediate Free Recall

Meyer assumes Grimes' theory which states that the organization of a text is a psychological process as well as a linguistic phenomenon (Marshall & Glock, 1978-79, p. 14) and also Frederiksen's (1977, p. 57) which states that if there is a semantic structure manifest in language, it must also represent an aspect of human memory structure. In other words, the structure of a text is a reflection of the knowledge structure of the speaker or the writer who produced it.

The processes of retrieving information from semantic memory and linguistically expressing this information through recall ought to reflect the organization of memory (Frederiksen, 1977, p. 68). In other words, the meaning in a text is reconstructed in the mind of the reader or listener and this meaning is reflected in the reader's or listener's recall. This recall, which is highly structured and not random, can then be matched against the structure of the text itself. It becomes necessary to accept that memory is structured, that this memorial structure is similar to semantic structure and that the semantic structure of recall is similar to memorial structure (Marshall & Glock, 1978-79, p. 14). In so doing, memorial structure can be reflected in the structure of recall. This is the basis of recall analysis.

For Meyer, as for Grimes (1975), Frederiksen (1975a,1977), and Kintsch (1974), memorial structure has a propositional base. The process of acquiring information during reading is the interaction of the propositions from a text and the organization of these propositions into structured text bases under the control of a schema. Thus, comprehension involves the construction of a text base. A text base is a set of propositions in the writer's or speaker's mind. It always remains unknowable to a certain extent. For each text base there is a list of macropropositions (levels two to four or the top third of the content structure) which corresponds to the gist of a text and whose highest level is the TLS (hence the name), and a list of micropropositions (levels five to eight in the content structure) which corresponds to individual sentences. The TLS, macropropositions and micropropositions are the three basic levels of text (Meyer, 1981) (see Appendix A).

A template text base is an *idealized* representation of the meaning of a given text by a reader (or listener). It contains propositions, elaborations and necessary inferences. A protocol text base is a subject's recall and is considered a text in its own right. In the present research, subjects were asked to recall a text immediately after having read it. No cues were provided as to the content of the text. This is termed immediate, free recall.

The free written recall task is used in much current second language reading research (Carrell, 1984, 1985, 1987, 1989; Connor, 1984; Kern, 1989; Lee, 1986a, 1986b; Urquhart, 1984).

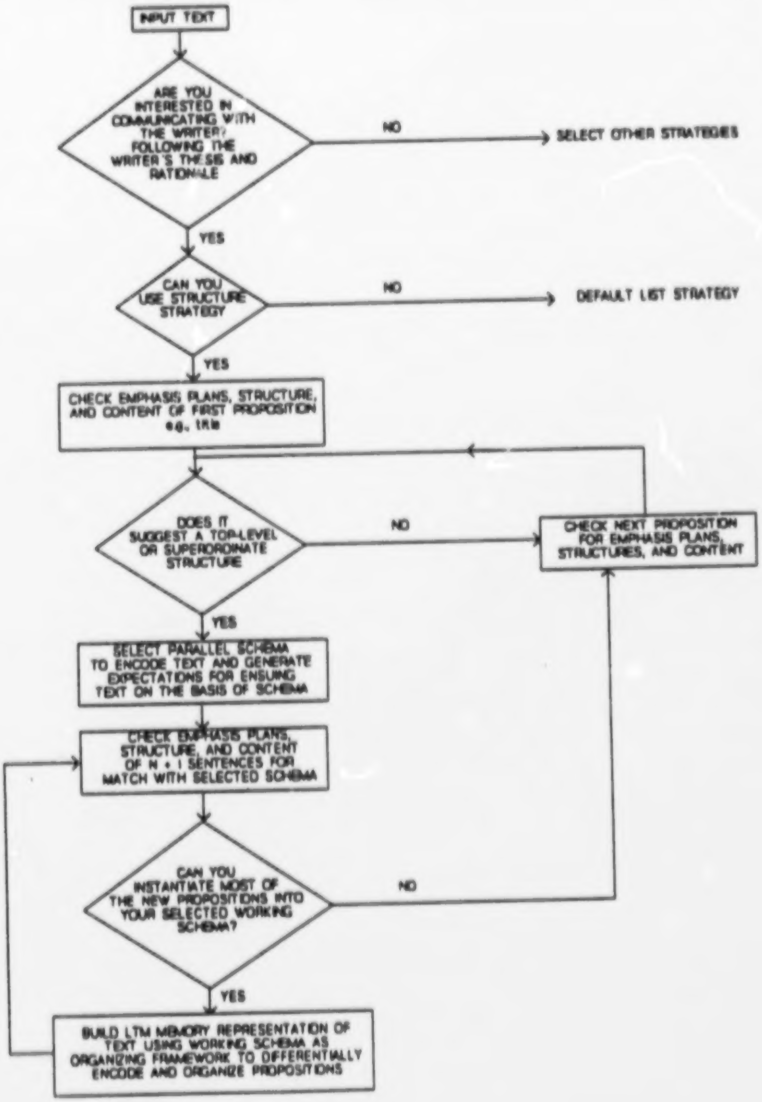
The Structure Strategy

According to Meyer (1975a) information from text is stored by readers (or listeners) in the hierarchical tree structure corresponding to the content structure derived from text analysis. Insofar as a reader is successful in building a text representation similar to that of the writer of the text, the information contained at the various hierarchical levels of the tree structure will be the same in the reader's and in the writer's structural representation of the text, that is, information high (levels one to four) in the writer's representation will also be high in the reader's.

This is not a straightforward matching process but a complex interaction of reader strategy and text structure. Meyer and Rice (1984, p. 162) have stated that skilled readers seem to approach a text both with knowledge about how texts are conventionally organized and a strategy to look for and use the TLS in a text. It is an expectation structure. From examining what over 1000 adults wrote down after they read passages and then predicted what would come next, Meyer and Rice identified a reading strategy that their successful readers used. They termed it the ***structure strategy***. Meyer (1987, p. 63) has provided a model to illustrate how the structure strategy might function. It is pictured in Figure 2.

FIGURE 2

Model for Getting Text Into Organized Schemata in Memory


INPUT TEXT
ARE YOU INTERESTED IN COMMUNICATING WITH THE WRITER? FOLLOWING THE WRITER'S THESIS AND RATIONALE
NO
SELECT OTHER STRATEGIES
YES
CAN YOU USE STRUCTURE STRATEGY
NO
DEFAULT LIST STRATEGY
YES
CHECK EMPHASIS PLANS, STRUCTURE, AND CONTENT OF FIRST PROPOSITION e.g., title
DOES IT SUGGEST A TOP-LEVEL OR SUPERORDINATE STRUCTURE
NO
CHECK NEXT PROPOSITION FOR EMPHASIS PLANS, STRUCTURES, AND CONTENT
YES
SELECT PARALLEL SCHEMA TO ENCODE TEXT AND GENERATE EXPECTATIONS FOR ENSUING TEXT ON THE BASIS OF SCHEMA
CHECK EMPHASIS PLANS, STRUCTURE, AND CONTENT OF N + 1 SENTENCES FOR MATCH WITH SELECTED SCHEMA
CAN YOU INSTANTIATE MOST OF THE NEW PROPOSITIONS INTO YOUR SELECTED WORKING SCHEMA?
NO
YES
BUILD LTM MEMORY REPRESENTATION OF TEXT USING WORKING SCHEMA AS ORGANIZING FRAMEWORK TO DIFFERENTIALLY ENCODE AND ORGANIZE PROPOSITIONS

In this model, Meyer assumes that a first proposition can strongly cue a skilled reader as to the TLS of a text. At this point, the skilled reader checks the match between the TLS selected from his/her own store of TLS's (formal schemata) and the first proposition of the text and generates expectations related to this selected TLS. He/she searches for propositions in the text which could fulfill these expectations and relates them to the organized mental representations they are creating. The skilled reader then attempts to fit these propositions into the selected schema. If the skilled reader is successful, a long term memory representation of this text which matches that in the actual text is created. Note that the reader can also select other strategies or can use a default list strategy.

Meyer (1979) maintains that the use of a TLS is also operational upon retrieval, that is, when a reader (or listener) is asked to recall a text. If this person uses the same TLS during recall as was used to encode the propositions of the original text, then this reader or listener will be able to recall more of the idea units of this text than readers who could not or did not use it. It is a systematic, top down process of retrieval via a TLS (Britton, Meyer, Simpson, Holdredge & Curry, 1979).[5] Signal words can also help readers to construct an internal representation of text (van Dijk & Kintsch, 1983; Meyer, 1975a). In this instance, there is also bottom up retrieval. The two types of processing may occur simultaneously and interdependently in which case the term interactive processing may be applied (van Dijk & Kintsch, 1983; Rumelhart, 1977).

What is remembered from a text depends on the TLS chosen to govern the comprehension processes and on the text itself. These two determine the type of memory representation that is created.

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[5] Kintsch (1982a) has stated that conventionally organized texts should give rise to stable retrieval structures. van Dijk and Kinstch (1983, p. 16) speak of a top down retrieval strategy. Anderson, Pichert and Shirey (1983) stated that a reader's schema has encoding and retrieval effects and that these effects are independent. Rumelhart and Ortony (1977) stated that a schema operates during encoding and also during retrieval.

These conclusions are based on the following research findings which have been forthcoming from Meyer's work.

Firstly, ideas which are located at the top level of the content structure are recalled and retained better than ideas which are located at the lower levels. This is referred to as the levels effect.[6] Meyer and McConkie (1973) found that the probability of recalling an idea was related to its position in the content structure. Ideas higher in this structure were recalled (for a ***listening*** passage) by more subjects. Idea units higher in the structure served as cues for the recall of those immediately below them. Also, ideas higher in the content structure appeared more stable in recall.

In 1975, Meyer published *The Organization of Prose and its Effects on Memory*. She found that memory for text is hierarchically organized which causes, in part, the hierarchical pattern produced at recall. The levels effect was confirmed as a psychologically valid concept for written texts. Meyer had designed this study to include one text on 'Fast Breeder Reactors' (from the *Scientific American*) and a second one that she wrote using the same content structure but different content (on 'Anti S Proteins for Schizophrenics'). She embedded a target paragraph high in the content structure and low in the content structure of both texts. Target paragraphs were recalled better when high in this structure. Her results showed that:

> readers rehearse and subsequently store in long term memory that information most centrally related to the higher level organization in a passage. In memory, information more centrally related to a passage's overall organization is retained longer. (Meyer, 1975a, p. 145)

She confirmed (1977a, 1977b) that the content structure of a text is the most powerful variable related to recall. The height of an idea unit influences its recall. Ideas high in the content structure are more likely to be recalled immediately after reading and are subject to less forgetting over time. Hence, the importance of the content structure as a determinant of learning and retention of information.

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[6] Kintsch and Keenan (1973) found that superordinate propositions were recalled better than subordinate ones, what they called the 'levels effect'. Note that the levels effect is also seen in narrative text.

Secondly, the type and structure of relationships among ideas in prose dramatically influence recall when they occur at the top levels of the content structure; however, when the same relationships occur low in the content structure, they have little effect on recall. Meyer (1975a) stated that when the same target paragraphs occurred low in the content structure, recall suffered. She concluded that information at the lower levels of the content structure appears to be remembered to a lesser degree immediately after reading a passage, and it is forgotten faster with time.

Meyer's System: A Justification for its Use

At this point, a justification for the use of Meyer's system for analyzing prose as compared to that of Kintsch (1974) and that of Frederiksen (1975a) seems warranted. Meyer's system for analyzing text was developed to allow investigations of the effects of TLS on the listening and reading recall of prose material. It is, thus, limited to texts with an obvious TLS. It yields a hierarchical representation of rhetorical predicates as the content structure of a text is obtained. The highest level of this content structure, the TLS, represents the overall textual organization pattern and is available upon a first analysis of a given text.

In Kintsch's system (1974; Kintsch & van Dijk, 1978), hierarchy is defined by the principle of argument repetition, that is, the more an argument is repeated, the higher it is placed in the template text base which is a list of all of the propositions in a text produced by a reader or listener. Important propositions are those which have been processed more often and for this reason are higher in the template text base. This hierarchy would not reveal the overall textual organization pattern upon a first analysis of text. A second would be necessary to sort out these higher level or more frequent propositions in order to establish the overall textual organization pattern. This could be very time consuming for the researcher faced with the now double examination of recall protocols against a template text base. The Kintsch system is more appropriate when there is a concern for content items rather than their interrelationships. It was originally developed to aid in determining what information in a text was available to the learner so that recall could be more easily scored. In more recent years, it appears as an integral part in van Dijk and Kintsch's model of text comprehension (1983).

In Frederiksen's system for analyzing prose (1975a) there is a semantic network, which although very extensive and comprehensive, contains no hierarchical structures. The second network, or logical network, has three kinds of relations: algebraic, logical and causal. Causal relations do reveal a certain hierarchy in that there is a fixed order for the listing of the agent, verb and cases. However, this hierarchy is not indicative of the overall textual organization pattern. Frederiksen's system is more concerned with the memory storage of logical relationships. It was formulated to study the inferences made by readers when reading a text.

Because of these reasons, Meyer's system seems more appropriate for the researcher investigating textual organization patterns or TLS's.

To this researcher's knowledge, Meyer's system has appeared more frequently in second language research using reading and recall (Allen et al., 1988; Carrell, 1984, 1985; Connor, 1984) than that of Kintsch which appears less often (Wolff, 1987). To this researcher's knowledge, the Frederiksen system has not yet appeared in published articles investigating second language text comprehension.[7] Thus, frequency of use could prompt a second language researcher to select the Meyer system.

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[7] At the University of Montreal, M. Beer Toker and Lilly Kormos are using Frederiksen's frame analysis to investigate schoolchildren's reading and recall in French as a first and as a second language. Their results are forthcoming. M. Beer Toker, personal communication.

Meyer's system analyzes expository prose primarily from the author's or researcher's and not the reader's point of view, as do both the Kintsch and Frederiksen systems, thus doing away with multiple reader interpretations of a given text. Various inferences and elaborations could be obtained through lists of acceptable paraphrases using Meyer's system (see Appendix B). A researcher mostly interested in reader inferences and would do well to avoid using Meyer. Since this researcher wanted to investigate text from the author's point of view and not the reader's, which is what Meyer does, Meyer's system seemed most appropriate.

For Meyer, the true meaning of text is that which is intended by the writer or speaker. And this is found in the text base and not in the template text base or reader's interpretation. The need to establish communication between reader and writer requires such an ideal even if the reader's comprehension can never exactly match the author's. Meyer and Rice (1984, p. 321) state: "The structure of text may appear different to different readers. Therefore, text is analyzed from the author's point of view".

Meyer's system, which has been tested with more than 1000 subjects ranging in age from 13 to 65, supports models of reading comprehension which incorporate schema theory. Rumelhart & Ortony (1977) have listed four characteristics of schemata. They have variables, they can embed one within the other, that is, their overall structure is thought to be hierarchical, they are generic concepts which vary in their levels of abstractions and they represent knowledge rather than definitions, that is, they are more general and abstract. From these given characteristics of schemata, it can be seen that TLS's are schemata. They can embed one within the other; they are hierarchical (see Appendix A). They are general concepts and are thought to be independent of content. Meyer has stated:

> I view the rhetorical relations of collection, causation, response, comparison and description in text as evidence for the use of these general schemata by writers. Their various subtypes are more specified schemata. These

> rhetorical relationships in text match up with patterns or ways of thinking in the mind of the writer and the mind of the reader. (1985, p. 280)

For all of the above reasons, Meyer's system seemed most appropriate for the purposes of the present research which employs prose having such a hierarchical structure.[*]

Limitations of the Study

The present study was limited to university level anglophones of high intermediate French proficiency reading select, well structured, expository texts in French. It took place in a formal learning situation within two intact classes at the Second Language Institute at Ottawa University.

Chapter II presents a review of related literature, chapter III, the methodology for the study; chapter IV presents the results and chapter V, a discussion cf these results.

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[*] Meyer states that her system for parsing prose can also be applied to stories or narrative text. See B.J.F. Meyer, M.J. Haring, D. M. Bluth and C. H. Walker (1980). Comprehension of stories and expository text. *Poetics* 9, 1-3, 203-211.

Chapter II

The Review of Related Literature

This chapter reviews theoretical, empirical and experimental studies that provide a rationale and basis for the present study.

Text comprehension, whether in a first or second language, is a highly complex, multidimensional process whose goal is the semantic representation of what has been said or written (Deschênes, 1988). It is the building of a macrostructure of text. It is written text, or discourse, which is of interest in the present research. Discourse comprehension is not a simple projection of linguistic structures but is the interaction of new information with old information (Anderson & Pearson, 1988, p. 37). This interaction is tripartite, for it involves the reader, the discourse and the context or social situation (titles, subheadings, goal and/or perspective of the reader) in which the discourse is read (Deschênes, 1988). In this way, it can be seen that discourse does not in itself carry meaning. Instead, it provides directions for readers as to how they should retrieve or construct the author's intended meaning and structure of the discourse from their own store of previously acquired knowledge or schemata.

The notion of schemata is taken from Kant's *Critique of Pure Reason* in which he proposed that concepts could have meaning only when they were related to something the individual reader already knew. It has found its way into modern psychology from the writings of Bartlett who is generally given credit for the term itself (Rumelhart & Ortony, 1977, p. 108).

Schemata are thought to be abstract cognitive structures composed of various kinds of knowledge (Schallert, 1982, p. 20). There are two general types of schemata (Anderson, Pichert & Shirey, 1983, p. 271; Carrell, 1987, p. 461, 1985, 1984, p. 446; Connor, 1984; Deschênes, 1988, p. 41; Eskey, 1988). The first type is content schemata and represents a reader's experiential background and/or is related to the content domain of a given text. It embodies the reader's existing knowledge of real and imaginary worlds. The use of content schemata has been investigated in studies using ambiguous passages which demonstrate that the interpretation of content is dependent upon prior knowledge (Anderson, Reynolds, Schallert & Goetz, 1977) and upon cultural background, particularly in a second language (Johnson, 1981, 1982; Steffensen, Joag-Dev and Anderson, 1979). In both first and second language studies on content schemata, there is ample support that content schemata influence text processing.

The second type of schemata, referred to in the present study as TSL, represents the global form of a given text. The evidence on formal schemata that will be reviewed suggests that these formal schemata, like content schemata, influence text processing.

The present study will examine the role of five (after Meyer) TLS's used as a strategy (the structure strategy) for adults reading select, well structured expository texts in French as a second language. In order to examine this, certain first language studies investigating TLS's and the effects they have had on adult reading performance (Part I) need to be considered. The second part of this review will look at the effects of TLS's on second (and foreign) language reading performance. Problems arising due to possible interference from the rhetorical patterning and signal words from the first to the second language will be examined in Part III.

PART I – Empirical Studies of the Effects of TLS's on First Language Adult Readers of Expository Prose: An Overview

The cultural specificity of TLS's

It appears that the years of reading a language allow the native speaker to acquire its TLS's (Anderson, 1984; Anderson, Reynolds, Schallert & Goetz, 1977, p. 378; van Dijk, 1981, pp. 76+89; Krashen, 1981, 1989; Maynard, 1985, p. 218; Smith, 1983; Swaffar, 1988, p. 129). van Dijk and Kintsch stated

(1983, p. 245) that they do not know to what extent readers have conscious knowledge about TLS's, but they assume that they have learned them after all their reading experiences during their adult life (van Dijk, & Kintsch 1983, pp. 16, 48, 54, 252; 1978, p. 373). It is a question of exposure to them (Pearson & Camperell, 1985). In the same view, Horowitz (1985) stated that successful readers somehow acquire specialized knowledge about TLS's (p. 449).

It also appears that within a given culture a reader and a writer have shared expectancies as well as shared knowledge of TLS's. The reader, for example, understands that a text was composed through deliberate choices on the writer's part, and the reader understands the conventions that governed these choices. The reader assumes that the writer had the reader's task in mind during composing and was trying to make the reader's comprehension possible. Because of these shared expectancies, the writer can attempt to guide the reader through the text. The reader, in turn, expects to be so guided (Grabe, 1987; Meyer & Rice, 1982). Olson, Mack and Duffy (1981, p. 287) refer to this as the Guidance Principle. Within a given culture a reader and a writer also have shared knowledge of TLS's. Each TLS calls forth a set of expectancies and suggests specific strategies to be applied (Adams & Bruce 1982, p. 18). This implies that the reader approaches a text with a model of what to expect. The reader is, in fact, looking for a TLS to use. Adams and Bruce (p. 21) refer to this as the Good Structure Heuristic which can be seen to overlap with the Guidance Principle as stated above and with the structure strategy as used in the present study.

Text Based Factors and their Effects on L1 – Reading Performance

A text based factor is a structural feature of discourse that affects reading performance. Organization and the levels effect, the latter, previously discussed, are text based factors.

Organizatio

It has been seen that readers seem to approach a text with certain expectancies, one of which is to find and use the TLS in it, or what Meyer terms the structure strategy. When TLS is evident, that is, when discourse is well organized, reading comprehension is facilitated.

Kintsch and Yarbrough (1982) wrote 10 essays that were pure examples of a particular rhetorical type (good form) and another 10 with identical content but no rhetorical structure (bad form). They found that adult university subjects were better able to answer comprehension questions (answers correct 53% of the time) concerning the topic and main points after having read the texts with good form than after having read those with bad form (answers correct 29% of the time, $p = .001$, p. 833). Various signals in the good versions triggered the appropriate rhetorical or formal schemata in subjects who then used these signals to organize these texts. The authors further noted that some readers might be able to "overcome lack of cues and scrambling" (p. 831), but that their subjects did not. The absence of form seemed to interfere with comprehension.

Meyer, Brandt and Bluth (1980) investigated 102 ninth graders who were asked to follow the TLS of a text in order to determine what is important to remember. Those students classified as good comprehenders (on the reading comprehension scale of the Stanford Achievement Test) utilized its TLS and recalled significantly more idea units ($p < .05$) (p. 87) on both a comparison and a problem solution text in both an immediate and a delayed recall condition.

Thus, well structured or organized discourse seems to promote better comprehension as well as more recall.

Proposed Differential Effects of TLS's

Meyer and Freedle (1984) postulated that some TLS's such as comparison, seem to be easier to read and to recall than others in that they appear to be more highly organized (see the separate cumulative scale for comparison in Figure 1). The superiority of the comparison TLS is presumably attributed to the fact that the ideas in this type of structure are more related to each other structurally; they are more interrelated. Hiebert, Englert and Brennan (1983) reported that high ability readers had greater sensitivity and skill in using comparison TLS's.

Meyer and Freedle (1984) investigated the differential effects of four TLS's: collection, comparison, problem solution and causation. They held content schemata constant while varying formal schemata, or TLS's. They hypothesized that collection would yield inferior recall because it had fewer organizational components. That is, the least organized type of text would yield the poorest recall. Subjects in this study were expected to select from memory the TLS that best matched that in the text (a listening passage) and to use it as the overall structure for processing the text. Four passages with identical content information on "Body Water" were produced in the four TLS's above. Forty-four teachers (graduate students in an introductory educational research course) ***listened*** to one of the four and were required to do an immediate free recall as well as an unannounced, delayed recall one week later. In both cases, the subjects who listened to the comparison, causation and collection passages tended to use the same TLS to organize their recalls as that in the given passage. There was a significant main effect for discourse type ($p<.005$) and for recall condition ($p<.001$). Recall was better for the causation and comparison passages (p. 135). However, subjects who listened to the problem solution passage organized their recalls with a completely different TLS. Differences in TLS's seemed to affect recall. In part two of this same experiment, only the comparison and collection TLS's were used. The passages had identical content. Twenty graduate students ***listened*** to one passage and organized their recalls with the TLS of the passage. However, those subjects listening to the comparison passage recalled more idea units ($p<.05$) (p. 139). From this, the authors concluded that the more organized TLS's such as comparison seemed to promote more recall when these subjects ***listened*** to them. Whether these findings would persist with undergraduates or secondary students remained a question.

Reader Based Factors and their Effects on L1 – Reading Performance

A reader based factor includes those characteristics of the reader which influence reading performance: the use of TLS and training in the use of TLS.

The Use of TLS

Meyer, Brandt and Bluth (1980) found that those ninth graders classified as good comprehenders utilized a text's TLS and thus recalled significantly more idea units. This implies that better readers possess these TLS's. Further, those subjects who used the TLS in a given text could discriminate better between related and intrusive information on the same topic.

In the Kintsch and Yarbrough study (1982) mentioned previously, those subjects reading texts with good form (evident TLS) and who used it in reading were better able to answer both topic and main idea questions on these texts.

Bartlett (1978) found that those ninth graders who perceived TLS's and who used them to organize recall, produced more recall than those who did not perceive them and/or did not use them to organize recall (p. 113). Hiebert, Englert and Brennan (1983) found statistically significant effects for ability (high and low) and TLS. High ability readers differed more substantially from low ability readers in their ability to use TLS's and to recognize intrusive information and also to use TLS's to generate topically and structurally related details.

Palmer, Slater and Graves (1980) replicated the Meyer, Brandt and Bluth (1980) study. With 28 ninth graders of high, average and low reading ability, they used the "Body Water" passage and another called "Supertankers" They found significant differences in the number of times high, average and low ability subjects used and did not use TLS (*p* <.001, p. 40) as well as significant differences in the number of times subjects used the TLS (p <.001, p.40). Those who used it recalled 50% of the text propositions while those who did not recalled 27% (p. 40). Good readers followed TLS more often than did poor readers.

Slater, Graves and Piché (1985) investigated the effects of structural organizers on the comprehension and recall of 224 ninth graders of high, average and poor reading ability. The structural organizers included: (a) TLS's presented before reading and accompanied by an outline grid, (b) TLS's alone and (c) detailed notetaking during reading. They obtained a significant effect (p <.001, p. 195) for reading ability; high ability readers recalled more idea units and also received the highest scores on a comprehension test based on the passage read.

Horowitz (1987) has suggested that skilled first language readers are aware of TLS's and can instantiate them even when they are not present in texts. Thus, they can overcome the absence of TLS's. For example, in a study by Urquhart (1984) some of his Scottish subjects actually reordered their recalls (p. 168) to conform to a time order (Meyer's sequence) when none was present in the discourse. Urquhart states (p. 168): "This is evidence of a tendency, in the absence of clear indications to the contrary, to interpret text order as paralleling time order, or to re-order it in a time order for recall purposes". Note that Faigley and Meyer's subjects (1983) used 'time' as a first criterion in classifying expository texts. Miller and Kintsch (1981) have suggested that the absence of TLS's merely denies the subject access to a particularly powerful set of constraints. It appears that poor readers are not aware of and do not use these structures in school learning (Horowitz, 1987, p. 119). What is unclear is when readers (or writers) become aware of them (Horowitz, 1985, p. 535).

From the above studies, it can be seen that readers who use TLS's during their reading, recall more information from text, and that good readers use TLS's more than poor readers do. Further research is needed to determine whether the use of TLS's can be used to discriminate good from poor readers.

Training in the Use of TLS

Bartlett (1978) investigated whether ninth graders could be trained in how to find TLS's while reading (a) and in how to use them to organize written recall (b). He also investigated whether this acquired strategy then facilitated recall, that is, whether more idea units were recalled (c). He was, in fact, teaching Meyer's structure strategy. He had pre tested his students as to their knowledge of TLS's and had stratified them according to those who neither identified nor used them, those who identified but did not use them, those who used them without labeling what it was they had used and those who identified and used them. Affirmative answers were found for all three issues investigated. Training in the recognition and use of TLS's was seen to facilitate recall in that more information was recalled after it.

Slater (1985), also experimenting with ninth graders, investigated whether their comprehension and recall of eight expository prose passages would improve if given training in the description and benefits of TLS's before reading such passages. His subjects were of high, middle and low reading ability as measured by the reading section of the California Achievement Test. He randomly assigned these students to one of two treatment conditions: brief training in a TLS plus an outline grid to fill in (based on this TLS) while reading (group A), and brief training in a TLS but no grid (group B). One control group was required to read and to take detailed notes (group C) and another was required to read and was asked not to take notes (group D). All groups recalled the passages read. Slater obtained significant results in the analyses of the recall protocols for both treatment and ability ($p < .001$, p. 716). Subjects in group A outperformed all others on the recall measure. The treatments had similar effects with the three ability groups.

From the above studies, it can be seen that subjects can be taught the structure strategy and that this training seems to promote more recall.

Some Problems

Slater, Graves and Piché (1985) used the following four TLS's in their investigation: comparison, description, causation and problem solution. They obtained no significant effect either for TLS or for passage for eight different texts.

Horowitz (1982) investigated whether TLS's functioned differently in oral and in written modes. She hypothesized that in formal situations, such as in school reading, a TLS will be read and reread making the synthesis of form and content more easily obtainable than in listening which is often timed and fleeting. She chose to replicate the Meyer and Freedle (1984) study since its authors had reported an advantage for the comparison TLS in a ***listening*** mode for graduate students.

The procedures followed were similar to those of Meyer and Freedle except that subjects (N=219) read passages. The "Body Water" collection, comparison, causation and problem solution passages were again used. In addition, a second passage on "Social Spiders", originally a problem solution text, but edited to resemble "Body Water" and having collection, comparison, causation and problem solution TLS's, was used. This passage contained 88 idea units compared to the 58 in "Body Water" but was similar in length. She chose ninth (secondary students) and thirteenth graders (undergraduates), for she was also interested in developmental differences in the use of TLS's. All students, ninth and thirteenth graders, were given a reading test. Content structures were established for all passages using Meyer's system of propositional analysis.

Contrary to what Meyer and Freedle (1984) had found for a listening modality, Horowitz obtained no main effect for TLS with secondary students and undergraduates. However, there was a significant interaction between TLS and passage (p = .035, p. 137). Further, there were no significant differences in the text recalls for the four different TLS's of the "Body Water" texts. But for the "Social Spiders" texts, the presumably more complex TLS's of comparison, causation and problem solution did facilitate recall (p =.001, p. 140).

For the "Body Water" problem solution text, the lowest mean recall scores were obtained. Meyer and Freedle (1984) had also found this. But for the "Social Spiders" problem solution text, the highest mean recall scores were obtained. Horowitz had appended Likert scales to her texts during the delayed recall, and it was confirmed that the "Social Spiders" passage was highly unfamiliar to her subjects.[1]

Additionally, the "Body Water" comparison text was not better in promoting recall than the collection text, unlike what Meyer and Freedle (1984) had found, but it was for the "Social Spiders" comparison text. The effects of TLS's were not the same across texts. They appeared to be random.

In sum, what Meyer and Freedle (1984) had found for ***listening*** recall was not replicated in a reading mode. Horowitz (1987, p. 144) stated that although some theoreticians and researchers have posited the saliency of particular organizational patterns in influencing text recall, arguments for the advantage of particular patterns, such as comparison "may be premature and incomplete".

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[1] Familiarity with text topic is the domain of content schemata and is beyond the scope of this dissertation. See the following articles for more information:

STEFFENSEN, M.S., JOAG-DEV, C., & ANDERSON, R. (1979) A cross-cultural perspective on reading comprehension. *Reading Research Quarterly 15*, 1, 10-29.

JOHNSON, P. (1981). Effects on reading comprehension of language complexity and cultural background of a text. *TESOL, 15*, 2, 169-181.

__________ (1982). Effects on reading comprehension of building background knowledge. *TESOL, 16*, 4, 503-516.

CARRELL, P & B. WALLACE. (1983). Background knowledge: context and familiarity in reading comprehension. In M. A. Clarke & J. Handscombe (Eds.) *ON TESOL* '84, pp. 295-307. TESOL publications.

__________ & P. Floyd. (1987). Effects on reading of teaching cultural content schemata. *Language Learning* 37, 1, 89-108.

YIN, K.M. (1985). The role of prior knowledge in reading comprehension. *Reading in a foreign language*, 3, 375-380.

ALDERSON, J.C. & URQUHART, A.H. (1988). This test is unfair: I'm not an economist. In P. Carrell, D. Eskey & J. Devine *Interactive approaches to second language reading*, pp. 168-182. Cambridge University Press.

Roen and Piché (1984) investigated the effects of specific micro level elements (cohesive devices such as reference and conjunctions) and macro level elements (problem solution or the response top level structure) on college freshmen readers' comprehension of two scientific, technical prose passages of 745 to 822 words. There were several versions for each discourse, that is, high and low conjunctions, high and low reference and absence or presence of TLS. All subjects read and did an immediate free written recall for one text. Idea units (after Meyer) from the recalls were compared to those of the original texts. Text topic was significant ($p <. 001$, p. 18). There was no main effect for the presence or absence of conjunctions, nor for the presence or absence of reference words. The presence of the response TLS exerted a non significant but substantial negative effect on written recall for one of the text topics as well as a non significant decrease in overall reading rate.

Thus, several more recent studies investigating the effects of TLS's on reading performance have indicated that these effects may be context bound, contrary to what Meyer and Freedle (1984) had found in a listening mode.

More empirical evidence in first language research is required before researchers can affirm that one TLS is more advantageous in promoting recall than another and that the use of the structure strategy distinguishes skilled from less skilled readers. More training studies are also needed.

PART II – Empirical Studies of the Effects of TLS's on Second Language Adult Readers of Expository Prose: An Overview

When reading in a first language, if a reader selects an appropriate TLS which matches that used in a given text and uses it to help organize the ideas within a text, the use of this TLS could affect reading performance as has been seen previously. Further, it is possible to train subjects in the use of TLS's as has been mentioned previously.

When reading in a second (or foreign language), however, culturally specific TLS's may not assist a second language reader, unless, of course, this reader is able to identify signal words and to use them accordingly.

There is some empirical evidence that second language readers transfer their first language TLS's to their second language when reading in the second language. There is also some evidence that second (or foreign) language readers do not recognize signal words. It is this aspect which is of prime concern in the present research.

Text Based Factors and Their Effects on L2 – Reading Performance

Organization

Carrell (1987) has done some work with stories and the effects of interleaving their events, that is, the organization of these narrative texts. However, story grammar is another domain and will not be considered here.

Urquhart (1984) cited an experiment by Marenghi and Frydenberg who used a first language group (*n*= 22) and an English as a Foreign language group (*n* = 44) of subjects with differing first languages (Japanese, Arabic and Turkish). There were two texts, one of which complied with a time order (version A) and another which deviated from such an order (version B). These texts were based on an original article chosen from a newspaper. One half of all the subjects read version A and the other, version B. All subjects recalled the written texts. In all cases, recall scores for the A version were higher than those for the B version.[2] There was a large difference between the foreign readers' mean scores for the A and B versions. For example, for the Japanese subjects, the mean scores for version A were 6.45 whereas those for version B were 2.00. For the Arabic and Turkish readers, the mean scores for version A were 4.09 and for B were 1.60. Thus version A which followed time order seemed easier to remember than version B. Urquhart concluded by stating that certain kinds of organizational patterns may present some foreign language readers "with very considerable difficulties" (p. 170).

Proposed Differential Effects of TLS's

Carrell (1984) investigated the differential effects of TLS's on the reading comprehension of 80 university level Spanish, Arabic, Korean, Chinese and Malaysian subjects of English as a second language. She used text adaptations of Meyer and Freedle's (1984) "Body Water" passage in four different versions: collection, causation, problem solution and comparison. Each version was read by 20 subjects. There was an immediate and a delayed recall. The number of idea units (after Meyer) was scored as well as the TLS used in the recall. There were significant main effects at the $p <.05$ level (p. 456) for TLS's, language group and recall. Thus, there were differences among the four TLS's in the recalls as well as differences among the language groups. In addition, for each language group, with the exception of the Arabic speakers, the comparison, causation and problem solution texts were statistically significantly ($p < .05$, p. 461) better recalled than the collection passage which is what Meyer and Freedle (1984) had found. In addition, those readers who identified the TLS of the discourse and used it to structure their recalls were able to recall more information from the discourse.

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[2] No texts were provided. Statistics are difficult to read because no mention is made of how recalls were scored nor what the total score was.

Reader Based Factors and their Effects on L2 – Reading Performance

The Use of TLS

Hague (cited in Oxford and Crookall, 1989) studied the reading strategy of using text structure to understand and retain information in a foreign language. Passages had the same content but the TLS varied (comparison, problem solution, causation and a collection of descriptions). Subjects who "consistently and appropriately" (p. 415) used text structure remembered more than those who did not use it both immediately and a week later.

PART III – The Transfer of First Language TLS's to the Second Language

Kaplan (1966) postulated that each language and each culture has a logic, an order, unique unto itself. He stated (1978, p. 681) that the second language learner superimposes on the rhetorical and stylistic alternatives of the second language, the realizable range of his first language. This second language learner lacks a knowledge of the internal logic of the second language system.

Hinds (1983) presented evidence for a major rhetorical style in Japanese expository prose which does not exist in English expository prose. When Japanese readers read English, they impose this *ki-shoo-ten-kitsu* rhetorical style onto English.

Hinds (1987) reported that a reader's degree of involvement in a text depends on the language of the reader. He found that English has a speaker writer responsibility wherein the speaker is the person charged with the responsibility for effective communication.[3] He suggested that in English, readers expect and require guidance through a text. Recall the Guidance Principle and the Good Structure Heuristic mentioned previously. Transition statements and/or words become very important. On the other hand, Japanese has a listener reader responsibility wherein the listener reader is the one responsible for effective communication. Transition words or statements may be absent or attenuated because it is the reader's responsibility to determine the relationships between any one part of a text and the entire discourse. As such, the Japanese reader reading in English may not expect to be guided by the writer. This reader may not pay attention to surface structure signals (read signal words) in English simply because this is not required in Japanese.

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[3] Adams and Bruce (1982, p. 3) have also stated that in English, the initial responsibility for a text's comprehensibility belongs with the writer.

Kitao and Kitao (1986, p. 13) also mentioned that English writers have more responsibility for their readers' comprehension than do Japanese writers, and Japanese readers have more responsibility for their own comprehension than do English readers.

Eggington (1987) has provided empirical evidence for the difficulties certain native speakers have in reading expository texts manifesting a style unlike that of their first language. Some Korean scholars who seem to be more proficient in English exhibit a particular structure in their writing which other scholars not familiar with English do not. Eggington hypothesized that Korean speakers could better reproduce (in recall) information presented in a more traditional non linear pattern than information presented in a linear pattern used by those Korean scholars influenced (through their reading of English) by the preferred rhetorical pattern of English. He used both a non linear style and a linear style in two Korean paragraphs. Eighteen adult Koreans read and recalled the linear version immediately and one week later, and another nineteen Koreans read and recalled the non linear version in the same way. Clausal analyses were performed on both versions of the paragraphs and then compared to the subjects' recalls. In the immediate recall condition, the subjects were able to recall approximately the same amount of information from both text versions; however, in the delayed condition, significant differences ($p <.001$, p. 166) were found. Eggington suggested that

Koreans had more difficulty recalling information presented in a linear rhetorical style, a style unlike their own. In other words, the unfamiliar way in which the discourse was organized (read TLS) influenced recall.

The Lack of Familiarity with Signal Words

Parry (1987) examined the reading skills of Nigerian subjects reading in English. These 20 subjects belonged to 12 different native languages; however, they all spoke Hausa, the lingua franca of Northern Nigeria. She selected a short reading passage (comparison TLS) with accompanying comprehension questions focusing on lexical items from the passage. In examining the answers to these questions as well as in interviewing the subjects afterwards, Parry discovered that there were many misinterpretations whose starting points were certain signals words (after Meyer) in the passage. For example, her subjects gave too narrow an interpretation for words such as *though* and *alike* (pp. 66-68) which created problems in understanding the rhetorical structure of the entire text.

Related studies prior to Parry's indicate similar difficulties with signal words which could create problems in the recognition of TLS's in English. In interviewing non native readers of English for Special Purposes, Cohen, Glasman, Rosenbaum-Cohen, Ferrara & Fine (1979) stated that non natives did not organize the material that they had read when that organization stretched across different paragraphs, even though cross paragraph markers were present in the text. They did not pick up on words like *however* and *thus* (p. 558).

Bacha and Hanania (1980) investigated some of the difficulties of 295 Arabic students reading English as a second language in using linking words. These linking words were defined as coordinators, subordinators, and conjunctive adverbials such as *therefore*, *however* and *in contrast* (read signal words). They suggested that while the differing rhetorical system of the first language may cause problems, "the difficulty appears to stem more directly from a restricted knowledge of linking words in the English language and of the logical relationships associated with each " (p. 251).

Cooper (1984), like Cohen et al. (1979), noted that unpractised readers, that is, those who have pursued their previous education through the medium of their first language and have studied English as a foreign language are very uncertain as to the meanings of explicit sentence connectors (p. 132) such as *however*, *despite*, and *nevertheless* He states (p. 133): "if readers do not understand the jobs that such words perform in relating and organising meanings above the sentence level, their reading is indeed severely handicapped". Such was, in fact, the case with his unpractised Malay readers.

Berman (1984) has stressed the tendency of English as a foreign language readers (in this case, Israeli) to select one form for any given grammatical formative such as *since*, *while* and *then* (read signal words) and to interpret them always as time relations rather than relations which could indicate reason, concession and result, respectively (pp. 143-144).

Bensoussan and Laufer (1984) investigated to what extent context helped in lexical guessing for 60 Israeli subjects of English as a foreign language. They collected the word guessing patterns of these subjects and discovered that the most common strategy was the application of pre conceived notions about the meaning of a word or words. Of these pre conceived notions, the most frequent was the wrong choice of the meaning of a polyseme as for example *yet* and *still* which were both interpreted as *until now* (p. 29) in context. These are signal words. Another pre conceived notion was the misapplication of morphology as for example in *nevertheless* which was interpreted to mean *never less* in context (p. 29).

Laufer and Sim (1985) interviewed 15 first year Hebrew university subjects from various university departments. Their purpose in interviewing these subjects was to discover how meaning was inferred when linguistic information was incomplete. These subjects were all studying English as a second language; their proficiency ranged from average to good. They were asked to read passages from M. Mead's *Male and Female* and were then required to answer several oral comprehension questions about the passage. These questions were asked and answered in Hebrew to eliminate any possible difficulties the students might have had in expressing themselves in English.

Laufer and Sim presented only a sample of misinterpreted sentences taken from the reading passages. For example, for the original sentence: (p. 9) "There again we see how tenuous the urge of the male to provide for his own children is, for it can so easily be destroyed by different social arrangements", basic errors included completely ignoring the word *for* (read signal word).

Bensoussan (1986) has not only indicated foreign language learners' unfamiliarity with the norms of written text in the target language, but has also cited certain lexical difficulties, namely misunderstandings resulting from logical connectors and modifiers. For example, her Israeli subjects studying English as a foreign language, translated *in effect* as *in fact* and *also* as *as a result* . She cites Sim who showed that difficulty in English as a foreign language reading comprehension for these subjects was linked to words such as "since, while, however, nevertheless and whereas" (p. 403). Subjects who misunderstood these signal words were assumed to have misunderstood the meaning of the larger context.

The above research seems to indicate a transfer of first language TLS's to second language reading as well as a definite lack of knowledge about the signal words of these TLS's.

At this point, two cautions seem warranted. It is not clear whether the texts used in the above studies were representative of the cultures for example, Japanese, Korean in question. A second caution involves the function of written text in these languages. Osterloh (1980), concerned mainly with Third World languages such as Turkish and Arabic, pointed out that in Third

World cultures, discourse functions very differently from the way it does in Western civilization. That is, discourse is associated with absolute truth, it is holy, it is incontestable (p. 65). Readers seem to identify the authors of discourse as persons of importance, not to be contested in any way. The only way for these readers to handle discourse is to memorize it. Arabic and Turkish readers do not need to skim a text to decide beforehand what is important to read and what is not, for everything that is written down holds equal importance. They also are not in the habit of taking notes, of writing resumés, or of commenting on discourse.

How does discourse function in Japanese, Korean, Hausa and Malay? This aspect should eventually be considered when researchers have more knowledge about it in these languages.

Note that all of the previously mentioned studies involve languages such as Japanese, Korean, Hausa, Arabic, Hebrew and Malay which are very distant from both English and French. It might be a good idea to use two Western languages in which texts are written to be contested (Osterloh, 1980, p. 65) and for which researchers appear to have more knowledge of the way discourse functions. The present study uses English and French.

Strategic Training in the Use of TLS's

While TLS's and signal words are thought to be difficult because of language differences and cultural specificity, some of these differences can perhaps be offset through training. Research and theory in second language learning strongly suggest that good second language learners use a variety of strategies to assist them in their learning (Barnett, 1988a; Bialystok, 1981; Block, 1986; Carrell, 1989a; Hosenfeld, 1977; Levine & Reves, 1985; O'Malley, Chamot, Manzanares, Kupper & Russo, 1985a, 1985b; Oxford & Nyikos, 1989; Ramirez, 1986; Reiss, 1985; Sarig, 1987). Strategic training has thus come to the forefront in second language studies.

A strategy is "any set of operations, steps, plans, routines used by the learner to facilitate the obtaining, storage, retrieval and use of information" (Wenden & Rubin, 1987, p. 19). Strategies are "the special thoughts or behaviors that individuals use to help them comprehend, learn or retain new information" (O'Malley & Chamot, 1990, p. 1).

In first language reading research, Paris, Lipson and Wixson (1983) have stated that learning to be strategic is rooted in development and in instruction (p. 293). "The critical element of a cognitive strategy employed by a learner is the intentional, effortful, self-selection of a means to and end" (p. 295). Strategies are skills that are made deliberate. They are skills under consideration. For example, skimming is a particular reading skill which when deliberately applied to a particular goal, when selected by a learner and not by a teacher (i.e., not simply complied to as for example when a teacher requires a learner to use skimming), when controlled by a learner can be a strategy. The learner must know what skimming is; this is declarative knowledge. The learner must know how to apply it; this is procedural knowledge. The learner must know when and why to apply it; this is conditional knowledge. In this way, a strategy is a deliberate action and as such is available for introspection or conscious report. It is a sequence of activities, a combination of skill plus will. When used blindly or obediently, it is merely a technique. It is insufficient to ask subjects to use a strategy; they need to be taught how to use it, and they need to use it on their own.

Kintsch and van Dijk (1983, p. 62) have stated that a strategy is not merely a way of reaching a goal, but concerns reaching it in an *optimal* [italics added] way.

Dansereau (1985) has defined the concept of learning strategy and has listed four characteristics of such strategies in first language research. An effective learning strategy is defined as a set of processes or steps that can facilitate the acquisition, storage and/or utilization of information (p. 210). Firstly, learning strategies may have direct impact on target information or indirect impact in that they improve cognitive functioning. Secondly, these strategies may involve a fixed sequence or may be heuristic in that the sequence may be modified. They may differ with respect to the scope of the task. For example, the SQ3R learning strategy is used with large bodies of text. And lastly, learning strategies may differ in their degree of specialization.

In second language research, O'Malley and Chamot (1990) have stated that strategic processes may be conscious initially but become automatic with practice and therefore may be performed without conscious knowledge. These learning strategies have been differentiated into three categories. Learning strategies may describe *metacognitive* or knowing about activities. They may also describe *cognitive* or knowing activities and *social/affective* strategies. Metacognitive literally means transcending knowledge and refers to the understanding of any cognitive process. Metacognitive learning strategies include knowledge about applying thoughts of one's own cognitive operations to others as well as planning, monitoring and evaluating a learning or problem solving activity (O'Malley & Chamot, 1990, p. 44; O'Malley, et al. 1985a, p. 24). They are higher order executive skills. Examples of such strategies are directed attention, evaluation and monitoring. Cognitive learning strategies are often specific to distinct learning activities and include steps in learning that require direct analysis. They operate directly on incoming information. Examples of such strategies are inferencing, elaboration and rehearsal. Social/affective strategies involve interaction with another person or some control over affect. Examples of these strategies include cooperation (with peers), questioning for clarification and self talk (O'Malley & Chamot, 1990, p. 46).

O'Malley and Chamot (1990) reviewed several of their studies on learning strategies derived from think aloud interviews. In the first study with beginning and intermediate English as a second language subjects, both the intermediate and beginning level groups used more cognitive than metacognitive strategies. But the beginning level students reported more strategy use than their intermediate level peers. The proportion of learning strategies varied according to the task. For example, most strategies were for vocabulary learning and pronunciation. In the second study, which O'Malley and Chamot termed the foreign language descriptive study, the foreign language students showed similar patterns of metacognitive and cognitive strategy use as compared to those reported by the English as a second language students. And like the second languge students, the foreign language students used more cognitive than metacognitive strategies. However, unlike in the first study, the more proficient students used more strategies. In a longitudinal study with foreign language subjects studying Russian and Spanish, there was no clear pattern (p. 141) which emerged in the comparisons of strategy use. As these subjects moved from one level of foreign language study to another over four consecutive semesters, there was a certain stability over time with some strategies whereas the task demands for listening and vocabulary (through cloze and writing tasks) increased the use of other strategies. The use of learning strategies depended on program objectives, prior foreign language study, task demands and student motivation. But what O'Malley and Chamot observed was that even the less effective students were acquainted with some learning strategies and were thus able to report them. It is this last point which provides a starting point for instruction in learning strategies.

Rubin (Wenden & Rubin, 1987) distinguished three types of strategies: learning, communication and social. Learning strategies are either cognitive,that is, steps used to obtain knowledge or metacognitive that is, knowledge about or the regulation of knowledge. Both contribute directly or indirectly to learning. Rubin named six cognitive learning strategies which contribute directly to learning, one of which is termed *deductive reasoning*. It is a problem solving strategy in which the language learner looks for and uses general rules in approaching the second language. This process is used to find the organization and patterns that make sense to the language learner in order to obtain and store information about the second language in an organized and retrievable form (p. 24). The logical procedures include: analogy, analysis and synthesis. It can be seen that Meyer's structure strategy is a type of cognitive strategy and that this strategy is termed deductive reasoning by Rubin.

Language Proficiency and Strategies

Strategies may interact with language proficiency that is, there may be a particular level of language proficiency required for strategies to be applied.[4] Some of the first studies in second language reading investigated this interaction. More recent studies have investigated the effects of strategic training on second language reading performance, more specifically, on the structure strategy.

Clarke's study with both Spanish and English speakers provided the basis for what he termed the *short-circuit hypothesis* in which" limited control over language 'short circuits' the good reader's system causing him/her to revert to poor reader strategies when confronted with a difficult or confusing task in the second language" (1979, p. 120). In the first part of this study, Clarke examined the strategies of 21 Spanish low proficiency good and poor readers (as determined by performance on cloze tests) reading in English and also in their native Spanish. When reading in Spanish, the poor readers relied more on syntactic cues and less on semantic cues than did the good readers. This finding implied a sequence of stages in the use of cues, from syntactic to semantic, in first language reading. But when reading in English, the second language, both the good and poor readers used syntactic information almost equally and the good readers' advances in using semantic cues declined. In this way, when reading in a second language, the good reader resembled the poor reader. In the second part of this 1978 study, Clarke used miscue analysis to evaluate the Spanish and English oral readings of two Spanish speakers. The good reader's superiority over the poor decreased in second language reading.

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[4] Although there has been a renewed interest in this language ceiling for some reading researchers, other researchers state that there is a definite reading and not a language problem in second language reading. See, for example:

FAVREAU, M., KOMODA, M.K., & SEGALOWITZ, N. (1980). Second language reading: Implications of the word superiority effect in skilled bilinguals. *Canadian Journal of Psychology* 34, 4, 370-380.

FAVREAU, M., & SEGALOWITZ, N. (1982). Second language reading in fluent bilinguals. *Applied Psycholinguistics* 3, 329-341.

__________ (1983). Automatic and controlled proceses in L1 and L2 reading of fluent bilinguals. *Memory and Cognition* 11, 6, 565-574.

SEGALOWITZ, N. (1986). Skilled reading in a second language. In J. Vaid (Ed.), *Language processing in bilinguals: Psycholinguistic and neuropsychological perspectives* (pp. 3-19). New Jersey: Erlbaum.

RANDALL, M., & MEARA, P. (1988). How Arabs read roman letters. *Reading in a Foreign Language* 4, 2, 133-145.

Still other researchers say there is both a reading and a language problem, especially for lower proficiency students. See J.C. ALDERSON, (1984). Reading in a foreign language: a reading problem or a language problem. In J.C. Alderson & A.H. Urquhart (Eds.), *Reading in a foreign language* (pp. 1-24). London: Longman.

The implications of Clarke's study are that there is no direct transfer of ability or strategies across languages and that foreign language competence is required before transfer can occur. Clarke stated that language proficiency thus played a greater role in reading than had been thought. There is, in fact, a threshold of linguistic competence which most likely varies from reader to reader and from task to task and which is necessary before second language readers can read efficiently.

The limitations of Clarke's studies lie firstly in the fact that he used cloze tests to identify his good and poor readers. Moreover, Clarke used miscue analysis to evaluate their oral reading samples. And he himself stated (1978, p. 140): "oral reading so restricts the performance of subjects that their miscues reveal similarities which would not be evident if their silent reading could be observed". He also questioned the ability of those researchers using the Goodman Miscue Inventory without being thoroughly trained to do so. These limitations should not be overlooked when examining Clarke's findings.

Cziko (1978) examined French natives and different proficiency level subjects reading French as a second language. He used meaningful, anomalous and random texts as well as cloze texts.[5] His study indicated that (p. 484): "a relatively high level of competence in a language is a prerequisite to the ability to use discourse constraints as information in reading". In other words, the use of strategies is related to the reader's proficiency in the language. His findings are similar to those of Clarke and also indicate a sequencing in the use of cues, from syntactic to semantic to discoursal.

In 1980, Cziko used oral reading samples subjected to miscue analysis to examine the reading of two groups of seventh grade students with intermediate and advanced proficiency in reading French as a second language as well as native French subjects. He concluded that both the natives and the advanced subjects drew on graphic and contextual information and relied more on graphic information. As Clarke had stated, Cziko also stated that reading strategies seemed to be related to the reader's level of competence in the language. Limited proficiency in the second language restricted readers from using specific textual constraints.

These concerns are reflected in a more recent comment from Eskey:

> Knowledge of the language of a text must be an integral part of whatever background knowledge is required for the full comprehension of that text. Language is a kind of schema, too, albeit one that for fluent native users may be activated automatically and there is no easy top-down route around that fact that fluent reading entails bottom-up perceptual and linguistic skills as well as higher-order cognitive processes. (1988, p. 96).

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[5] Cziko's anomalous text included (1978, p. 487):

> Là, le beau mond [sic] s'aimait. Ils couraient voir à toute partie. Ce jour-là, il [sic] se mettaient beaucoup de plaisir à leurs langues...

His random text included (1978, p. 487):

> Lentement moment, rat à l'éléphant cage jour et rat. Un gros son pas l'éléphant lui et mangea très...

Working mostly with immigrant and/or bilingual children, Cummins (1980) has made four points concerning Cognitive Academic Language Proficiency (CALP) which can be considered a form of linguistic threshold. Firstly, CALP is a reliable dimension of individual differences which is central to scholastic success and which can be empirically distinguished from basic interpersonal communicative skills (BICS) such as accent, and oral fluency in both a first and a second language. Secondly the same dimension underlies CALP in both a first and a second language. Therefore, first and second language CALP are interdependent. Thirdly, older learners acquire second language CALP more rapidly because their first language CALP is better developed. And lastly, to the extent that instruction through language X is effective in developing language X CALP, it will also develop language Y CALP provided there is adequate exposure to language Y and motivation to learn language Y since the same dimension underlies performance in both languages. Cummins offers several cautions in the interpretation of this threshold hypothesis. The threshold is not absolute and can vary depending on the learner, the task and the state of cognitive development of the learner (viz. children in this case). Note also that Cummins insists upon both adequate exposure and motivation in the second language, namely when motivation to learn the second language is low CALP will not be applied to second language learning. Further, the specific languages involved will also make a difference.

Although not investigating specific reading strategies and their interaction with language proficiency, Hudson (1982) provided some information on the language ceiling hypothesis. He began by examining whether there were second component factors (p. 4) in Clarke's short circuit hypothesis. Working with 93 English as a second language subjects of beginning, intermediate and advanced proficiency, Hudson used three different reading conditions: (a) pre reading activities, (b) vocabulary activities and (c) a control group with no particular treatment. He found that there were significant differences in the type of treatment used to induce schemata (in this case, content schemata) and also that the pre reading and vocabulary treatments had a greater effect on reading comprehension at the beginning and intermediate levels than at the advanced level. In this way, if a second language reader used a consistent initial schema, it could override the second language linguistic ceiling. Hudson specified, like Cummins, that this linguistic ceiling is not fixed but is relative to the task and to the reader. This implies that under given conditions and in spite of low language proficiency, stragegy use may transfer from the first to the second language.

Devine (1987) followed 20 beginning English as a second language subjects for one year in order to examine the interaction of oral reading performance and language proficiency. She had three oral readings per subject, each examined through miscue analysis. She found that her good readers did not move from relying on syntactic, to relying on semantic cues as did those of Clarke and of Cziko, but instead showed steady improvement in both. She found that increases in language proficiency as measured by grammar, vocabulary, cloze tests, composition scores and overall average test scores correlated with increases in the frequency of full semantic acceptability of oral reading miscues. Thus, gains in overall competence correlated positively with increased reading proficiency.

Devine (1988) stated that in certain cases low proficiency may be mitigated in reading in a second language. In examining two equally low level English as a second language readers, the first one with a meaning centered approach to reading (internalized model, patterned after Harste & Burke (Devine, 1983)), who performed much better than the second one with a sound centered approach, she speculated that a reader's internalized model of reading may determine the extent to which low proficiency restricts reading performance. Specifically, a sound centered approach plus low proficiency in the second language may result in a severely restricted transfer of first language skills to the second language (p. 130) whereas a meaning centered approach may mitigate low proficiency and allow this transfer. More research with a larger sample is required. At the moment Devine's statement remains a speculation.

Other second language researchers have attempted to show that there is a direct transfer of reading strategies from the first to the second language. For example, Block (1986) carried out a case study with three native English speakers, three Chinese natives and three Spanish natives all of whom were non proficient readers. She wanted to investigate the comprehension strategies of second language readers. All participants had taken a standardized reading test (p. 467). Subjects were required to read two texts aloud in their second language and to report (think aloud) exactly what they were thinking as they were reading. These sessions were tape recorded and the protocols were transcribed to furnish different strategy types, for example, anticipating content, recognizing text structure, using general knowledge, paraphrasing, rereading, and so on. These strategies were then classified into two modes: *reflexive* in which a subject related the text to his/her own personal experience and *extensive* in which the subject was more involved with the author's ideas. Subjects showed two consistent and distinctive patterns of strategy use. The integrators used only the extensive mode; the non integrators used mainly the reflexive mode. There was considerable individual variation in strategy use, however. She concluded that the development of strategy use was a stable phenomenon which transferred to the second language.

In their recent synthesis of learning strategies used by second language learners, O'Malley and Chamot (1990) stated that more effective second language learners use more strategies as well as a greater variety of strategies than less effective learners.

Although we still do not have research which definitively identifies those reading strategies used by skilled second language readers, there have been several training studies measuring the effects of direct instruction in reading strategies on the improvement of second language reading comprehension.

Levine and Reves (1985) demonstrated that an experimental group (*N* =59) of Israeli subjects improved their reading scores on a reading test in Hebrew after having received ten weeks of skill and strategy training in reading English as a foreign language. The subjects were instructed in the recognition and use of syntactic and discourse markers, the logical relations of comparison and causation and the distinction between general statements and examples as well as in the use of prediction, skimming, scanning and inferencing in reading English as a foreign language (p. 332). Descriptive statistics showed an improvement of 40% between the mean scores of the pretests and posttests for the experimental group but only 6% for those of the control group. The authors interpreted these results as evidence for a transfer of skills from the foreign language to the first language.

In 1985, Carrell investigated whether English as a second language reading comprehension could be facilitated by the overt teaching of TLS's (the structure strategy) and signal words in English. She used subjects of Chinese, Arabic, Malaysian, Indonesian, Korean, Japanese and Spanish origin, some of whom were placed into an experimental group (n=14) and some into a control group (n=11). She taught the experimental group how to identify and use the collection, causation, problem solution and comparison TLS's. Subjects in the control group read identical texts to those in the experimental group but received no training in the recognition and use of TLS's. The training sessions lasted one hour per day for five consecutive days. All subjects were then tested only on the comparison and collection TLS's for which they produced immediate recalls, scored for the presence or absence of idea units (after Meyer) from the original texts. There were significant differences in the identification ($p < .001$) and use ($p < .05$, p. 739) of the TLS's of the two texts. There were no significant differences for the control group. The mean on the posttest for the experimental group was statistically significantly larger ($p = .0009$, p. 740). Thus, they remembered more information. Carrell concluded that the overt teaching of TLS's (the structure strategy) facilitated second language subjects' reading comprehension in that they remembered more information from texts.

Kern (1989) has provided empirical evidence that explicit instruction in comprehension strategies can improve intermediate level French students ability to comprehend French texts and to infer the meanings of unfamiliar words from context. There were 53 undergraduate subjects, all of whom took an achievement test in French as well as a pretest termed the Reading Task Interview. This pretest, taken at the beginning of the semester, assessed their ability to comprehend a French text and to infer the meanings of unfamiliar words from context. Twenty-six subjects became the experimental group and received specific reading strategy training in word analysis (cognates, prefixes, suffixes, etc.), sentence analysis (logical "relationships *signalled* [italics added] by connectives such as parce que, si...alors, pourtant etc." p. 137), discourse analysis (jumbled sentences and inferring meaning from context etc.) and reading for specific purposes (students' attention directed to particular aspects of texts, for example, what is the main problem here? through prereading questions). At the end of the semester, after training, all subjects were tested as to their comprehension of a French text (equivalent to that used in the pretest) as well as to their skill in inferring the meanings of unknown words from context. Kern obtained a statistically significant main effect difference between the control and experimental subjects' comprehension gain scores (*p* = <.05, p. 139). He also found that lower ability subjects responded more favorably to reading strategy instruction than did middle and high ability subjects. A statistically significant main effect difference was found between the experimental and control subjects' inference gain scores (*p* = < .05, p. 142). Kern concluded that strategy instruction had an overall positive effect on subjects' ability to comprehend and to infer the meanings of unfamiliar words from context.

Carrell, Pharis and Liberto (1989) investigated whether (a) metacognitive strategy training enhanced second language reading, (b) one type of strategy training facilitated second language reading better than another and (c) the effectiveness of metacognitive strategy training was related to the learning styles of the subjects involved in their experiment. Of 26 subjects involved, eight, the control group, (group A) received no strategy training but underwent the usual reading syllabus (p. 659). For four days, nine subjects (group B) received training in semantic mapping, a strategy which includes brainstorming before reading, teacher modelling of a semantic map on the board and then subjects refocusing on the map after reading. For four days, nine subjects (group C) received training in the Experience Text Relationship strategy. This strategy included: (a) the teacher leading a discussion of what subjects already knew, that is, their experience; (b) subjects reading short parts of a text while the teacher asked questions and (c) the teacher helping subjects to draw relationships between their experience and the text. The teacher modeled this process.

At the same time, Carrell et al. used Schmeck's inventory of learning processes (ILP) to measure subjects' learning styles such as deep processing which assesses the exent to which students critically evaluate, conceptually organize and compare and contrast the information they study (p. 662).

All subjects were pre and posttested on four measures: (a) multiple choice questions on a text, (b) open ended questions, (c) a cloze semantic map and (d) a semantic mapping test. Results were non significant for the control group (A) for the four measures. For both treatment groups (B and C), results were non significant for the multiple choice questions, but there were significant gain scores on the open ended questions. Each group, however, showed differences in gain scores on other dependent measures (cloze semantic mapping and semantic mapping). In this way, one type of strategy training appeared to facilitate second language reading. Carrell et al. obtained a significant interaction between the deep shallow scale of the ILP and strategy training treatment on the semantic mapping scores of the posttest. In both the semantic mapping and Experience Text Relationship groups (B and C), both deep and shallow processors performed well on the posttest semantic map; however, in the control group (A), only deep processors did this well. In the semantic mapping group (B), those high on the elaborative scale of the ILP outperformed those lower on it. In the Experience Text Relationship group (C), those low on the elaborative scale of the ILP outperformed those higher on it. In this way, the two training methods seemed related to differences in the learning styles of the subjects.

Carrell et al. concluded by stating (p. 669) that second language reading pedagogy should benefit from the inclusion of "explicit, comprehension fostering metacognitive strategy training". Strategies must be taught.

The present study included training in the use of TLS's, or the structure strategy.

Some Problems

There seems to be conflicting evidence as to the role of first language background when investigating the effects of TLS's on reading comprehension in a second language.

Martin (1981) found that second language readers process hierarchical and spatial chronological texts in English as a second language differently depending upon their first language. She studied eight language groups (*N*=190): Farsi, Arabic, Japanese, Mandarin Chinese, Spanish, Korean, Indonesian and Cantonese. Hierarchical order was defined as the developmental sequence of concrete or abstract ideas in written English consisting of steps along a continuum of general to specific information (p. 70). The reading skills instrument used was an extended cloze that is, a deleted sentence with multiple choice responses. It contained three hierarchical and three spatial chronological subtests, each of 230 to 300 words. The spatial chronological passages provided a uniform measure of a second processing skill generally considered "easier" than hierarchical and served also to "control for general English language competence" (p. 71). Significant differences were found between Arabic and Korean and Arabic and Chinese language groups in their performance on the spatial chronological subtest. Significant differences between means on the hierarchical subtest were found at the .05 level and above for the Arabic speaking group with five other language groups – Farsi, Japanese, Spanish, Korean and Cantonese. The Indonesian group differed significantly at the .05 level and above from the Farsi and Japanese groups. Martin states that these results suggest that first language background is a significant variable in the proficiency of non natives in processing spatial chronological and hierarchical information in context in English.

Carrell (1984) had found a significant main effect for language group in her study.

On the other hand, Urquhart (1987) examined the results of a previous experiment with Japanese, Arabic and Turkish readers recalling descriptive and narrative units.[6] In this experiment a text following time order proved easier to remember for all of the second language readers. He stated that the validity of a time ordered text appeared to have been established *regardless* [italics added] of the language background of the readers (p. 170).

Connor (1984), like Urquhart, suggested that some recall may not be affected by first language background. Using English, Spanish and Japanese subjects (*N*=31) reading a problem solution text in English, she discovered that there was a significant difference between the first language subjects' mean idea units recalled and those of the second language subjects, but there was no difference between those of the Spanish and Japanese subjects (p. 251). In examining the kind of propositions recalled (superordinate or subordinate), she obtained a significant difference between those of the first language subjects and of the second language subjects but no difference between the two second language groups. This finding led her to believe that the recall of high level ideas (superordinate) may not be affected by first language background.

In her study, Block (1986, p. 477) found that there was no pattern of strategy use to distinguish the Chinese subjects from the Spanish subjects and none to distinguish the second language readers from the native English speakers. Although there was considerable individual variation in subjects' use of strategies, language background did not seem to account for the different patterns. Block stated that strategy use did not seem to depend on language specific features (p. 485).

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[6] See the Urquhart article (1984) for a description of descriptive and narrative units.

It might be a good idea for researchers to use homogeneous first language groups, if possible, when investigating the effects of TLS's on reading performance in the second language. The present study involved a homogeneous first language group of anglophones reading French as a second language.

Chapter III

Methodology

The present training study was based very loosely on those of Carrell (1985) for English as a second language, of Bartlett (1978) and of Meyer, Young and Bartlett (1989), both of which are first language studies. It was designed, however, to examine the effects of training in five TLS's, or the structure strategy, and signal words on the reading recall of *French as a second language* readers. To this researcher's knowledge, there exist no such published studies for French as a second language. Thus, this study was designed to validate and to extend findings to French as a second language.

This chapter includes descriptions of the design of the experiment, of the independent variables, of the texts used, of the dependent measures and of the reader assessment measure.

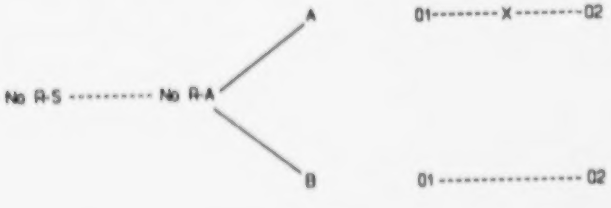
Experimental Design

The independent variables in this study were: (a) two expository texts in a problem solution TLS ('Fast Breeder Reactors' and 'Anti S Proteins for Schizophrenics') (see Appendix A), (b) TLS's, operationally defined as training in the use of TLS's and their signal words for an experimental group and question answering training for a control group (c) the results of a second language reading test for reading proficiency level. The research was quasi experimental with a non equivalent pretest posttest control group design. This design appears in Figure 3.

The effect of treatment was assessed by measuring the dependent variable of the experimental group. The control group provided an estimate of what the experimental group would have been like had it not been treated.

FIGURE 3
Research design

covariates or moderator variables	pre test	Control n=22 Exper. n=21 groups	independent variables	posttest 1 month later	dependent variable
L2 reading test reading time recall time reader assess.	Breeder Res. Schizophrenics recall in L1	A, B, C, D (1-9)	training in use of TLS's and signal words; question answering	Breeder Res. Schizophre. recall in L1	difference in recall scores from pre and post tests



Research Hypotheses

The research hypothesis for the present study is that there is a difference between training in the use of the five TLS's (Meyer's structure strategy) for high intermediate French as a second language readers and the amount of information freely recalled from a given, well structured expository text. The use of TLS is here defined as a recall protocol written using the appropriate signal words of the TLS of the original text and/or the organizational pattern of this given TLS (see Appendix B). The H_o hypothesis would state that there is no relationship between training in the use of select TLS's in reading French as a second language and the amount of information freely recalled from a given, well structured expository text.

Within the context of previous theory and research, there are several other considerations which come to light. Perhaps the high intermediate French as a second language reader has had ample opportunity to acquire the signal words and TLS's of French through reading and/or instruction. Perhaps this reader has internalized both.[1] These considerations can be stated as additional hypotheses as follows:

> H_1 The high intermediate French as a second language reader has learned to use the appropriate signal words of a given TLS and can organize recall with this given TLS.
>
> H_2 The high intermediate French as a second language reader has not learned to use the appropriate signal words of a given TLS but can organize recall with this given TLS.
>
> H_3 The high intermediate French as a second language reader has not learned to use most of the appropriate signal words of a given TLS and can not organize recall with this given TLS save for several sentences implying this TLS.
>
> H_4 The high intermediate French as a second language reader has not learned to use the appropriate signal words of a given TLS and can not organize recall with this given TLS *in any way.*

Subjects

Sample. Subjects were 43 anglophone students of a high intermediate proficiency level in French (as determined by the second language reading test) between 18 years and 23 years of age, studying full time at the University of Ottawa. The mean age of the control group was 20.59; that of the experimental group was 22.05. There were three males in each group for a total of six males. These subjects were drawn from two intact FLS 1704 one semester courses with a four skills orientation. All subjects had fulfilled the second language requirements at the University of Ottawa, that is, they had taken four one semester courses previous to FLS 1704 or had an equivalent. There were thus no language level differences between the subjects prior to the training. All subjects were tested and trained in intact classes. They were paid for their participation in the experiment.

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[1] An acquired strategy involves a non academic or functional environment. A learned strategy involves an academic environment or formal setting.

Setting

At the University of Ottawa, the evening classes of most courses in the Faculty of Arts and Social Sciences are open to both part time and special students, that is, those not studying in any degree program. These evening courses may contain students of all ages, social status, educational and language backgrounds, some of whom have had no previous university experience. For these reasons, two day time, 1704 classes were selected for the present study.

Both of the 1704 courses in this study took place from Monday to Thursday between 11:30 a.m. and 5:30 p.m. and this for a thirteen week period. FLS 1704 is an elected, not an obligatory course.[2] The course description for FLS 1704 as printed in the University of Ottawa calendar reads as follows: Exercises permettant aux étudiants de porter un jugement critique sur un texte oral et écrit. Production du paragraphe. Développement de la communication orale dans une variété de situations. Préalables(s): FLS 1703 ou la permission de l'Institut de Langues Secondes. Textbooks selected by teachers for this course include: *Comprendre Tout le Monde*, *Improving French Pronunciation* (CEC), *Grammaire Française* (Jacqueline Olivier), *Conversation sans Fin* (G. Rooks), *Situations* (P. De Méo) *et Regards Contemporains* (M.A. Parmentier).

A list of courses across Canada that are considered by the Institut de Langues Secondes to be equivalent to this FLS 1704 course is appended (see Appendix C). This 1704 course can be viewed as a conventional, four skills course that is found in other Canadian universities offering FLS courses.

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[2] Oxford and Nyikos (1989) found that university students in elected courses used strategies more often than did those in obligatory courses.

Both 1704 groups had FLS teachers with similar backgrounds and teaching experience. Both 1704 groups had the same assistant (the researcher) to administer the pretest and the posttest. An outside instructor, with background and teaching experience similar to that of the two FLS teachers, provided the training for the experimental group.

Pre Experimental Procedures

Second Language Reading Test

All subjects took this test one week before the experimentation began. It was used to establish the reading ability of the subjects and to further ensure that there were no language level differences between the experimental and the control groups prior to the training.

The researcher administered this second language reading test to all subjects in their respective classrooms. This test is part of the Second Language Institute's French Proficiency Test which measures listening and reading ability. Only the second part, dealing with reading, was used. The reading test of the French Proficiency Test always contains three reading passages as well as a rational cloze, all of an academic nature. All four subtests are always in multiple choice format, and each item in each subtest includes a key and three distractors. The September 1989 version of the French Proficiency Test was selected because of its reliability (.9145) and validity. It had been used with 580 students in August and September of 1989 at Ottawa University.

The first reading passage (subtest four) contained 326 words and was titled "Mensa", a club for intelligentsia. It contained four items (see Appendix D for the difficulty and discrimination of each item in this second language reading test). The alpha for this subtest was .5241. The second reading passage, subtest five, of 562 words was entitled «Le Boomerang» and had five items. Its alpha was .3878. The third passage, subtest six, of 464 words, had six items and was entitled «Qu'est-ce qui fait un gagneur». Its alpha was

.4955. The rational cloze passage of 300 words, entitled «Le Musée Dostoievski à Léningrad» (subtest seven) had 30 blanks and an alpha of .8943.

All students completed subtests four, five, six and seven within 55 minutes. This is the usual amount of time allotted for the reading component of the French Proficiency Test. Note that no time limits were imposed and that the class period was one and one half hours so subjects could have taken the entire period to complete this second language reading test. The researcher noted the time taken to complete this test for each student in both groups.

Experiment Proper

Pretest

Each subject was given a booklet (see Appendix E), which included a cover sheet of instructions (Parts I and II), a text to read ('Les Réacteurs Régénerateurs' or 'Les Protéines Anti S pour Schizophrènes'), a reader assessment of text measure, guidelines for the recall and a yellow envelope. The researcher read these instructions aloud in English as the students read them silently. Any questions were dealt with at this time. Subjects were instructed to record both their beginning and ending reading and recall times. The researcher circulated among the subjects to ensure that all noted their reading and recall times, placed the text read in the yellow envelope immediately after reading it so as not to refer back to it during recall and did the reader assessment measure before doing the recall. There were no exceptions to this sequencing. All subjects completed the pretest within one hour.

Note that a purpose for reading the texts was provided in the instructions (see Booklet in Appendix E) in that subjects were told that they were reading in order to be able to tell an absent classmate about the content of the text read. This instruction as to the purpose for reading was found in both the pretest and postest.

Training Procedures

A coin was tossed to determine which group served as the control and which became the experimental group. There were 22 subjects in the control group and 21 in the experimental group.

For the training sessions, the experimental group received systematic training by the outside instructor in the use of five TLS's – description, sequence, causation, problem solution and comparison. These training sessions concentrated on teaching the use of TLS's and their corresponding signal words as a strategy for promoting recall, in fact, Meyer's structure strategy. There were five hours of training, one hour for each TLS (see Livret de l'Étudiant X in Appendix F).

The subjects in the experimental group were told that what the outside instructor taught was to be considered as an integral part of the course. This outside instructor communicated daily with the regular instructor. Role call was taken for each of the training sessions. Only one student was absent for one training session. This information was given to the regular instructor. Also, the outside instructor noted the class participation of each subject and gave this information to the regular instructor.

The type of training used in the present research is termed a self control training study (Brown, Campione & Day, 1984) because subjects are instructed in how to use, monitor, check and evaluate the strategy taught (see Livret de l'Étudiant X in Appendix F). It is also known as a direct study (O'Malley & Chamot, 1990, p. 153). This type of study, compared to a blind training study in which subjects are induced to use a strategy without concurrent understanding of the meaning of the activity as well as an informed training study in which subjects are both induced to use a strategy and given some information concerning the significance of the activity appears to be the most successful at inducing not only enhanced performance but also transfer of training to appropriate settings (Brown et al., 1984, p. 15).[3]

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[3] Wenden and Rubin (1987, p. 12) have also stated that facility in the use of strategies must be accompanied by an internal change of consciousness.

All subjects in the experimental group received explicit instruction dealing with what the structure strategy is, that is, knowing that or declarative knowledge; with why it should be learned, that is, knowing why and when or conditional knowledge; and also with how to use it, that is, knowing how or procedural knowledge (see Paris, Lipson and Wixson, 1983).

The structure strategy was decomposed into its component parts (see Appendix F, Livret de l'Étudiant X). The outside instructor explained what the structure strategy was in session one. A definition of it was given at this time (Step A). The instructor explained why it should be learned in session two (Step B). She explained how to use it in session three (Step C) and when to use it in session four (Step D). The outside instructor verified the short quizzes with the subjects. These quizzes were included to help the subjects evaluate their use of the structure strategy (Step E). These five steps (A-E) have been suggested for the effective, direct instruction of reading comprehension strategies (Winograd & Hare, 1988).

In addition to these five steps, all subjects were to evaluate their partner's use of the structure strategy. This responds to Carrell et al's. (1989, p. 669) suggestion to include explicit, comprehension fostering, metacognitive strategy training in the second language reading programme.

The sequencing in the experimental group training program is based partly on Niles' suggestions for teaching text organization (1965) and also on Meyer, Young and Bartlett's program for old adults (1989). Niles' suggestions include: (a) discuss the concept of pattern and demonstrate that ideas are arranged in patterns, (b) arrange sentences into different patterns, (c) identify the structure of single paragraphs, (d) understand the signal words (as described in Meyer) of these patterns, (e) study mixed patterns, (f) demonstrate that the recognition of a pattern affects performance and (g) use longer texts (see Livret de l'Étudiant X in Appendix F). Meyer et al.'s program includes one hour of training for each TLS in the following order: description, sequence, causation, problem solution and comparison. This order was maintained in the present research.

Note that this experimental program underscores signal words because it is apparent that second language readers may not be familiar with the forms that these words take. However, if as has been stated previously, the native speaker somehow acquires the TLS's or formal schemata of a language, it can be stated that this speaker is already familiar with the concepts of description, comparison, causation, sequence and problem solution, five frequently occurring patterns in English. The experimental training program serves to familiarize French as a second language readers with the words that help to signal these TLS's or formal schemata in French.

The control training program (see Livret de l'Étudiant C in Appendix G) contains the same texts in the same order as those in the experimental training program. The professor in this class was instructed in how to use this program (see Appendix H) through three meetings with the researcher. The teacher of the experimental group (not the outside instructor) was also invited to these meetings. The structure strategy was not mentioned. The control treatment, question answering, represents a conventional study procedure (Berkowitz, 1980, p. 165; Carrell, 1985) which was intended to provide subjects with additional text inspection time beyond that of simply reading but with no special focus on text structure. The instructor of the control group was requested to spend five consecutive hours on this program, in fact, the same amount of time as in the experimental program (see Appendix H). Thus, the questioning answering or control treatment covered the same amount of time as the structure strategy training of the experimental group.

Both treatments, experimental and control, included dyad or cooperative learning. In second language research, cooperation has been classified as a socioaffective strategy (O'Malley et al. 1985b, p. 584). It has been defined as working with one or more peers to obtain feedback, pool information or model a language activity. In the first session of the experimental program and the second of the control program, subjects were encouraged to work with a partner. This same partner was retained during the next sessions. Each subject of the pair was at times the reader and at others the recaller; they were equal partners. In the last session of each program, all subjects worked individually.

In first language learning, it appears that dyad learning may serve as a training ground for metacognitive skills such as error detection and making judgments that are transferable to individual learning (Larson, Dansereau, O'Donnell, Hytecker, Lambiotti, & Rocklin, 1985). Dyad learning was included in both programs to foster individual learning.[4] Both programs also included written recalls for some of the texts read.

The pre experimental procedures and the experiment proper required two weeks. The FLS 1704 course meets for four hours per week.

Posttest

A posttest was administered one month after the end of the training period. During the posttest, all subjects read and recalled a second text (see experimental design on page 56).

Materials

There were two texts used in the study: 'Fast Breeder Reactors' and 'Anti S Proteins for Schizophrenics'. These texts were taken from Meyer (1975a). Meyer explained how she established the equivalency of these texts. 'Fast Breeder Reactors' is an original text taken from the *Scientific American.*. Meyer analyzed it to determine its content structure. Then an identical content structure was drawn with its content missing. New content to be placed into this content structure had to fit logically into it. Once the topic of schizophrenia was found to meet these requirements, content related to it was placed in the appropriate slots in the barren content structure. Thus, both texts yield identical content structures except for the specific lexical units which enter into the content structure.

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[4] The effects of dyad learning were not tested.

In English, the language of recall in the present study, both texts have 193 idea units (see Appendix A). Both texts were to produce equal recall.[5]

The researcher chose to test the problem solution TLS over the four others investigated by Meyer because according to the cumulative scale (see Figure 1), this particular TLS is supposedly easier for subjects to recognize due to its greater number of interrelationships. Further, Horowitz (1982, p. 136) has called for research considering the problem solution TLS and its companion pattern, causation, because of the importance of this TLS and its increasing use in technical writing for modern, science oriented societies.

Carrell (1985) trained English as a second language subjects in the structure strategy for four TLS's: collection, causation, problem solution and comparison. Only the comparison and collection TLS's were included in the pretest and posttest. Carrell states that this was due to time constraints (p. 737). In the present research, only the problem solution TLS was used in testing, but all five TLS's were taught. Time constraints also played a role in the present research.

Lee (1986a) used Spanish translations of Bransford and Johnson's "Washing Clothes" and "Balloon Serenade" texts.

Duchastel (1979) investigated the joint effects of TLS's, learning objectives and time on the recall of expository prose. His subjects were 113 native French females in Switzerland. The texts he used were Meyer's (1975a) "Fast Breeder Reactors" and "Future

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[5] Meyer stated that these two texts produce equal recall. She recommended their use to me. (personal communication)

Energy Sources" which he translated into French. The researcher translated Meyer's 'Fast Breeder Reactors' and 'Anti S Proteins for Schizophrenics' texts into French. The readability of these two French texts was established using Henry's formula as it has been validated for French as a foreign language (Cornaire, 1985). Both texts fall within the 0-30 range which Henry terms 'difficile'. The 'Fast Breeder Reactors' text measured 30; 'Anti S Proteins for Schizophrenics' measured 27.

Two texts were retained in the present research for the following reasons. Firstly, in several recent studies on second language reading using a written recall task, two texts were used. In the previously mentioned Urquhart (1984) study, there were two texts, version A which complied with time order and version B which deviated from it. Carrell (1985) used a pretest and a posttest each of which included two texts: one with a comparison TLS and a second with a problem solution TLS. Lee (1986b) used two texts – one familiar and one novel. Kern (1989) had two texts of equivalent difficulty in his study. Passage A was read and recalled by one half of his subjects on the pretest; passage B was read and recalled by the other half. This procedure was reversed for the posttest.

Secondly, it appears that if the same text is used in both a pretest and posttest there will be a memory effect. Frederiksen (1975b) stated that after a second presentation of the same text, a subject could change memory structure for it by adding new information. Frederiksen (1975b) investigated subjects asked to recall a listening passage to examine whether their overgeneralizations, paraphrases and elaborations reflected gaps (errors) in memory structure or fundamental processes used in acquiring information from discourse. That is, these processes are built into a subject's understanding of a text. Subjects listened to a passage entitled "Circle Island" four times and wrote four recalls. As a subject built up a semantic structure for the passage on "Circle Island", the derived information became an integral part of the subject's understanding of the text. This derived information was maintained as part of the subject's knowledge structure. Thus, the overgeneralizations, paraphrases and elaborations were seen to be fundamental processes in acquiring information from discourse. Frederiksen has also shown that the amount of derived information, that is, overgeneralizations and inferences increased with repeated exposures to the text. He stated:

> These results appear to justify the conclusion that the context in which a discourse occurs, when the context is related to what the subject does with information he acquires from the discourse, can affect very significantly the semantic information which a subject incorporates into his memory structure for a text and hence his *understanding* of the text. These differences in understanding are produced by differences in *how* the discourse is processed *during input* of the discourse. The effects of such contexts on memory are enduring and probably have a permanent influence on memory structure for the text. (1975c, p. 163)

Kintsch (1982) argued that when readers read a text, they not only form a template text base (list of propositions) and situational model of it in long term memory, but they also use the information obtained from the text to update their model of the world. For example, if a reader were to read a text about breeder reactors, he would not only construct a memory representation and situational model for it, but his memory about breeder reactors would also be modified and would still be effective after reading the text. Memory representation for it would have changed. Thus, this reader would not read the same text on breeder reactors in the same way the second time.

For these reasons, two texts were used in the present study.

Kintsch and van Dijk (1978, p. 376) outlined three characteristics of texts to be used for recall purposes. Firstly, they must be sufficiently long to ensure the involvement of macroprocesses in comprehension. If texts are short, in immediate free recall, subjects can obtain good results through memorization. In this case, recall protocols show great similarity to stimulus materials, and it is difficult to establish whether this superior recall is due to text structure or to memory. To date, most of the texts used for recall in both first and second language experiments have been rather short, less than 400 words, in fact (Bartlett, 1978; Carrell, 1984, 1985; Connor, 1984; Horowitz, 1982; Kintsch & Yarbrough, 1982; Meyer, Brandt & Bluth, 1980; Meyer & Freedle, 1984; Urquhart, 1984). In the French texts used in the present study, there were 626 words in 'Les Réacteurs Régénerateurs' and 753 in 'Les Protéines Anti S pour Schizophrènes'. The words were counted using Henry's (1975, p. 65-66) prescriptions for counting words.

The second characteristic of texts to be used for recall according to Kintsch and van Dijk is that they be well structured in terms of a schema or TLS. This is the case for the texts in the present study both of which are in the problem solution TLS (see content structures in Appendix A).

The third characteristic is that they be understandable without technical knowledge. It has been mentioned that the 'Fast Breeder Reactors' text was taken from the *Scientific American*. The texts used have ecological validity in that university students can be expected to meet similar texts in their studies.

The texts used in the present study can be seen to possess the three characteristics noted by Kintsch and van Dijk.

By random assignment, one half of all subjects read the 'Fast Breeder Reactors' text during the pretest and the other half read the 'Anti S Proteins for Schizophrenics' text. This procedure was inversed for the posttest.

Dependent Measures

Multiple dependent measures were used in this research. They are described below.

Number of idea units recalled in immediate free recall

The main dependent measure was the use of signal words and/or TLS, or the structure strategy, in reading expository texts in

French as a second language. It was operationally defined as the scores obtained on immediate free pretest and posttest recalls. Meyer's system for parsing prose (1975a) was used to score these recalls. All of the recalls from the pretest and posttest were scored against the content structures of the two texts used in the study for the number of idea units recalled. There were 193 idea units in each text in English; thus, 193 was the highest possible score. These results were termed the pretest and the posttest recall scores.

During the scoring of both the pretest and the posttest recall protocols, all subjects were placed into groups representing the four additional hypotheses of the present study (see p. 57 this research. See also Appendix B). Each recall was assigned a letter A, B, C or D corresponding to these four hypotheses. Each subject's recall was also numbered from one to nine (see Appendix B). Thus, for each subject, the researcher obtained the total number of idea units recalled, a group letter (A,B,C or D) and a number (one to nine). For example, for the pretest recall of subject one, the score was 45 6C. This same scoring procedure was followed for the posttest recalls. In this way, it was possible to compare movement from group to group (A to D) as well as movement within a group (A1, A2, A3, B4 ,C5, C6, D7, D8, D9). This allowed the researcher to observe a subject who may have written a recall with the given problem solution TLS, (A3) but whose knowledge of the signal words in French for solution was lacking. It was possible for this subject to remain in group A and to use the signal words for solution (A1).

Previous second language research using a recall task (Carrell, 1984,1985; Connor, 1984; Urquhart, 1984) has required subjects to recall in their second language. This procedure has been criticized by Lee (1986b) who found significant main effects ($p <.01$, p. 207) for the language of recall (first or second language) and for four ability levels of 320 subjects reading Spanish as a foreign language. Lee stated:

> Since a main effect was found for language of recall, using a native language recall task yields more evidence of comprehension, which might be masked by a

> target language recall task. If quantifying comprehension is crucial to a research design, the way in which comprehension is evaluated becomes an issue. (1986b, p. 207)

Because the present research was concerned with quantifying comprehension through the number of idea units recalled, all subjects were required to recall in their first language, English.[6]

Reading Time

Reading time is purported to be critically related to the amount of information recalled after reading a text. Kintsch and Keenan (1973) observed that reading time increased regularly as a function of the number of propositions in a text. They demonstrated that when reading is self paced, subjects correctly recalled 80% of the propositions in a text (p. 264). More recall means longer reading time. Reading time can thus be considered as a measure of text processing ease. Kintsch and Vipond stated:

> If one is interested in comprehensibility, recall scores can never be considered in isolation because they depend crucially on reading times...neither reading time nor amount of recall alone provides a satisfactory index of processing difficulty but only their combination. (1979, p. 338)

In the present research, subjects were given as much time as they needed to complete both the reading and recall tasks during both the pretest and the posttest. They were told that the experiment was not a test of speed, that they had different texts to read and that they would finish reading and writing at different times (see Booklet in Appendix E).

Reading time in minutes and seconds for each text for each subject in the present research was determined in the following way.

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[6] Note that more recent reading studies require subjects to recall in their first language. See Wolff, 1987, for example.

A portable Toshiba computer programmed to count out seconds from 0 to 99 minutes was placed in the front of the classroom. The size of the screen was 24,5 cm by 8 cm. The size of the royal blue digits was seven cm in height and four cm in width. All subjects were instructed to write 0 for «le temps au début de la lecture» on their reading passages in the allotted space. After having read aloud the instructions for the reading and recall task, the researcher set the counter to 0. Each subject took as much time as needed to read the passage. Then, each subject simply glanced up at the counter when finished reading, noted the time elapsed in minutes and seconds and wrote down these figures in the space marked «votre temps de lecture» at the end of the reading passage. Subjects then placed the reading passage in the yellow envelope provided and completed the reader assessment task. Subjects were also instructed to write down the time at both the beginning and the end of the recall task in the allotted space, again using the counter.

If subjects are allowed as much time as they need to read, the possibility of their memorizing a text arises. In this case it is difficult to know whether superior recall is due to superior memory or to the use of the structure strategy, or to some other factor.

There have been several first language studies with adults which have attempted to control for the effects of memorization on recall. Anderson and Pichert (1978) introduced a vocabulary test between a reading and a recall task as did Anderson, Pichert and Shirey (1983), R. C. Anderson et al. (1977), Pichert (1980) and Spiro and Tirre (1980). Steffensen, Joag-Dev and Anderson (1979) used 50 items from a vocabulary test to "introduce a short retention interval" (p. 16) and to inhibit short term memory (Steffensen, 1986). Shanahan and Kamil (1982) used a page of three digit multiplication problems to reduce the recency effects of short term memory. McGee (1982b) used a distractor addition problem. Kintsch and Young (1984) used a 20 minute reading and recognition task unrelated to the reading passage in question.

In second language reading studies with adults, Carrell (1987) used a debriefing questionnaire to "minimize the effects of short-term memory as well as to elicit relevant information on the subjects" (p. 469). For these last two reasons cited by Carrell, a reader assessment task was introduced between the reading and the recall tasks of the present study.

Reader Assessment Task

This task was another dependent measure (see Booklet in Appendix E) and was included in both the pretest and the posttest. It consisted of ten Likert scales, each having five alternative responses, moving from negative (1) to positive (5).

Previous research (Clements, 1979, p. 303; Martins, 1982; Spiro, 1980, p. 255) has shown that affect, or the intensity of feeling attached to the semantic content of discourse, has a role to play in text processing. It appears that semantic information associated with a high degree of affect is processed at greater depth than is semantic information of an indifferent nature, provided all other factors remain constant (Martins, 1982, p. 152). A favorable attitude toward content can supposedly lead to heightened attention and comprehension and to greater recall (Mathewson, 1985, pp. 851-852).

The task used in the present research was adapted from both Horowitz (1982) and Carrell (1989). In addition to minimizing the effects of short term memory and eliciting relevant information about subjects, the reader assessment task was designed for subjects to judge each text read for difficulty, memorability, affect, interest, background knowledge, clarity of argument, organization, recommendations, content and discussion of content.

Each subject completed the reader assessment task immediately after reading on both the pretest and posttest. Because each subject read both texts, there were two reader assessment tasks per subject. One was termed the pretest Likert scale items and the other the posttest Likert scale items. After each assessment task, each subject recalled the text read.

Procedures for obtaining reliability in the scoring

Intrarater reliability

The researcher began by scoring the 'Fast Breeder Reactors' recalls. She scored 23 and then returned and scored the same 23 again to ensure consistency. Note that as the list of paraphrases for the different idea units grew, the researcher always returned to previous recalls to score them accordingly. The researcher completed the remaining recalls on 'Fast Breeder Reactors'. Intrarater reliability for idea units recalled was 0.99. It was 1.00 for group letter categories and group number categories.

The researcher then began scoring the 'Anti S Proteins for Schizophrenics' recalls. She scored 43 recalls. She then returned to the last 20 of these 43 and rescored them. Intrarater reliability for idea units recalled was 0.99. It was 1.00 for group letter categories and group number categories.

Interrater reliability

The researcher blindly chose 20 recalls of the 86 total. These were given to a second scorer who was familiar with Meyer's system (1975a) for parsing and scoring prose. This scorer also received a copy of the Decision Rules and Procedures for Scoring and Grouping (see Appendix B). The researcher and second scorer met once to discuss these rules and decisions. They scored two recalls together at this time. The second scorer scored one recall alone at this time. Procedures for scoring were standardized. The second scorer took the 20 recalls previously chosen by the researcher and scored them alone, at home. She returned them to the researcher. Interrater reliability for these 20 recalls was 0.99. It was 1.00 for group letter categories and group number categories. Both interrater and intrarater reliabilities were defined as the Pearson Product Moment correlation between scores.

Statistical treatment of data

The recall scores, or the number of idea units recalled, would be determined using Meyer's system of propositional analysis. The difference in the number of idea units from the pretest to the posttest for each student for each text would then be compared. This type of data would require an ANOVA.

If there were initial differences in the reading test scores from the second language reading test or in the pretest recall scores, then either or both of these would have to be used as covariates when comparing the means of the pretest and posttest recall scores.

Chapter IV

Results

This research examined the influence of the structure strategy on the recall of expository prose for students reading French as a second language. It also considered reader assessment of text difficulty, memorability, affect, interest, background knowledge, clarity of argument, recommendations, organization, content and discussion of content. Text topics were 'Fast Breeder Reactors' and 'Anti S Proteins for Schizophrenics'. Subjects were 43 full time university students at the Second Language Institute at the University of Ottawa.

Findings are reported for each of the dependent measures used in the experiment proper as well as for the second language reading test used in the pre experimentation. The dependent measures included: (a) the number of idea units recalled for the pretest and the posttest (b) reading time and (c) the responses to the 10 Likert scale items.

Descriptive Statistics

Descriptive statistics for the second language reading test, the pretest and posttest recall scores, the pretest and posttest reading times, the pretest and posttest writing times, the pretest and posttest group number and group letter categories and responses to the Likert scales are presented in Table II.

From Table II, it can be seen that the means for the second language reading test were higher for the control group (M=34.23) than for the experimental group (M=32. 19). The experimental group took a longer time to complete this reading test (M=49.29); their pretest recall scores were higher (M=48.43)[1] that is, they recalled more idea units out of a possible 193 (see Appendix A). They

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[1] These refer to two separate variables.

TABLE II
Descriptive Statistics for All Variables for the Sample

	Control Group n=22		**Experimental Group n=21**	
VARIABLE	M	SD	M	SD
L2 reading test[a]	34.23	4.73	32.19	5.55
reading time for L2 reading test	39.36	4.50	49.29	5.38
pretest recall	46.41	23.48	48.43	27.01
pre reading time	15.53	3.84	22.60	7.51
pre writing time	12.39	5.30	14.51	5.38
pre Likert 1[b] (difficulty)	2.73	.94	2.95	.92
pre Likert 2 (memorability)	2.46	1.01	2.67	.73
pre Likert 3 (affect)	3.41	.73	3.71	.72
pre Likert 4 (interest)	2.68	1.13	3.14	1.28
pre Likert 5 (back. know.)	1.64	.85	1.95	1.12
pre Likert 6 (clarity of argu.)	3.50	.86	3.48	.87
pre Likert 7 (organization)	3.73	.88	3.81	.68
pre Likert 8 (recommen.)	2.91	1.11	3.71	.90
pre Likert 9 (content)	2.91	1.31	3.38	1.12
pre Likert 10 (discussion of content)	3.05	1.17	3.24	.94
pretest number[c] category	4.41	3.39	5.24	2.77
pretest letter[d] category	2.32	1.36	2.67	1.16
posttest recall	37.82	18.83	50.91	27.98
post reading time	12.87	2.94	18.17	4.45
post writing time	10.04	4.29	11.46	4.30
post Likert 1 (difficulty)	2.77	.75	2.57	.75
post Likert 2 (memorability)	2.32	.89	2.62	.92
post Likert 3 (affect)	3.36	.58	3.29	.56
post Likert 4 (interest)	2.73	.99	2.71	.96
post Likert 5 (back. know.)	1.91	1.07	1.71	.90
post Likert 6 (clarity of argu.)	3.27	.77	3.29	1.06
post Likert 7 (organization)	3.64	.79	3.76	.94
post Likert 8 (recommen.)	3.05	.72	3.38	.74
post Likert 9 (content	2.91	1.11	2.86	1.06
post Likert 10 (discussion of content)	3.09	1.07	3.14	.96
posttest number category	4.77	3.10	2.24	2.17
posttest letter category	2.46	1.34	1.38	.97

[a] score out of 45
[b] score 1 (negative) to 5 (positive)
[c] score 1 (highest) to 9 (lowest)
[d] score A=1. B=2. C=3. D=4

required a longer time to read the pretest text (M=22.60). They required a longer time to write the pretest recall (M=14.51) for this text. The experimental group scored higher on all of the pretest Likert scale items, except item 6, clarity of argument. Note that the Likert scales moved from 1 (negative) to 5 (positive). They scored higher on the pretest number category (M=5.24) than did the control group (M=4.41) (see Appendix B Decision Rules and Procedures for Scoring.). Note that there were nine possible groups for the recalls and that higher means designated less knowledge. ***One*** was the highest and indicated a recall written with appropriate signal words and organized with the given TLS. ***Nine*** represented a random list with no association for grouping and no signal words. It can be seen from the pretest number category in Table II that there were more subjects in the experimental group unfamiliar with signal words and TLS's at the beginning of the intervention.

There were four possible letter categories: A, the highest, to D, the lowest. These letter categories represented the four additional hypotheses of the present research. A recall placed in group A, for example, was counted as one and indicated that this recall was organized with the given TLS and appropriate signal words. A recall placed in group B was counted as two, and so on. The experimental group scored higher on the pretest letter category (M=2.67) than did the control group (M=2.32) that is, more experimental subjects fell into groups B, C and D than subjects in the control group. There was thus a general tendency for subjects in the experimental group to have less knowledge about TLS's and signal words at the beginning of the intervention than for subjects in the control group.

The means for the experimental group for the posttest recall were higher (M=50.91) than those for the control group (M=37.82). Thus, the experimental group recalled more idea units after treatment than the control group.

The experimental group required a longer time to read the posttest text (M=18.17) and to write the posttest recall (M=11.46) as they had done on the pretest. This group scored lower on the following Likert items: 1 (difficulty), 3 (affect), 4, (interest) 5 (background knowledge), and 9 (content) than did the control group – unlike on the pretest. The means for the posttest number category were lower for the experimental group (M=2.24) than for the control group (M=4.77). Thus, more of the subjects in the experimental group were familiar with TLS's and signal words on the posttest than were the control group subjects. This same tendency is evident in the means for the posttest letter category, that is, for the experimental group the means were 1.38 whereas those for the control group were 2.46 for this posttest letter category. In other words, more subjects in the experimental group were familiar with TLS's and signal words at the end of the intervention than were those in the control group.[2]

The additional hypotheses are:

H_1 – ***group A subjects*** demonstrate little or no improvement in the use of appropriate signal words and in the organization of recall into the given TLS because of a ceiling effect. However, with training, they recall more idea units as predicted by the structure strategy.

H_2 – ***group B subjects*** demonstrate the ability to use appropriate signal words and are better able to organize recall into the given TLS. They recall more idea units with training as predicted by the structure strategy.

H_3 – ***group C subjects*** demonstrate the ability to use appropriate signal words and to organize recall into the given TLS. They recall more idea units with training as predicted by the structure strategy.

H_4 – ***group D subjects*** demonstrate the ability to use appropriate signal words and to organize recall into the given TLS. They recall more idea units with training as predicted by the structure strategy.

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[2] One of the students in the experimental group told me that the hardest part of the training was learning the key words, (read signal words) as she called them.

Table III presents the frequencies for the sample for letter and number categories for both the pretest and the posttest. Note that only 16 of the total 43 subjects in the sample possessed the structure strategy prior to the intervention. These 16 subjects were found in the following groups. In the control group, 9 were found in group A1, and 1 in group A2. For the experimental subjects, 5 were found in group A1 and 1 in group A3. In Table III, these 16 subjects have been marked with asterisks.

TABLE III

Frequencies for Letter Categories and Number Categories N=43

Group		Cont. Pre	Group post	Exper. Pre	Gr. Post
A1	subjects use appropri.	9*	6	5*	14
A2	signal words; recall org. in prob/solution TLS	1*	2		
A3			1	1*	4
B4	no signal words; but recall org. in prob/solution TLS	2	1		
C5	few or no signal words for prob/solution				
C6	recall org. with another TLS	3	5	10*	1
D7	recall org. with another TLS and some of	1	1	1	
D8	its signal words	3	3	1	1
D9	random list; no signal words	4	3	3	

Note: See also Appendix B Decision Rules and Procedures for Scoring and Grouping Immediate Free Recalls.

* Subjects possessing the structure strategy prior to intervention.

A Wilcoxon signed ranks test was used on this data for several reasons. Firstly, this test is non parametric and thus eliminates worry about the population distribution. Secondly, the subgroups (A to D) in the present research were quite small. It is more difficult to assess assumptions about the population in this case and thus safer to use a statistical test like the Wilcoxon signed ranks test which assumes little about the distribution of the population.

Wilcoxon signed ranks tests were carried out on groups A, B, C and D for the experimental group to establish whether the sum of the positive ranks differed from that of the negative ranks. These results are shown in Table IV. None of these results approached significance.

TABLE IV

Wilcoxon Signed Ranks Test (T+ or T-) for the Experimental Group

Group	n	increases from pre to postest[a]	T stat.[*]	p prob
A (hypo. 1)	6	1	19	.0938
B (hypo. 2)	–	–	–	–
C (hypo. 3)	10	8	40	.2324
D (hypo. 4)	5	3	9.5	.8126

[*] The largest value of T+ or T- was chosen.

[a] indicates the number of subjects whose recall scores increased from pretest to posttest.

Of the six experimental subjects in group A on the pretest, all six remained in A on the posttest (see also Table III). There was a ceiling effect. Training did not increase the number of idea units recalled (see Table IV). There was not enough evidence to support H_1.

There were no subjects in the experimental group who fell into group B either on the pretest or the posttest.

There were 10 experimental subjects in group C on the pretest. All but one fell into group A on the posttest. All but two recalled more idea units during the post test. There was not enough evidence to support H_3

There were five experimental subjects in group D on the pretest, one of whom remained in D on the posttest; the others moved into group A. All but two recalled more idea units on the posttest. There was not enough evidence to support H_4.

From the Wilcoxon signed ranks test in Table IV it is clear that the subgroup sample sizes (A,C,D) were small. There was, however, evidence of change as can be seen in the increases from the pretest to the posttest column in Table IV.

Pearson correlations were computed for all pairs of variables for the sample. Table V presents this matrix of correlations. Note that in Table V, the upper diagonal presents the pretest correlations whereas the lower diagonal presents those of the posttest.

There were no significant correlations between the pretest recall scores (REC) and the pretest reading times (RT), but there was a significant correlation between the pretest recall score (REC) and writing times (WT) (0.56 p <.001). That is, the longer subjects took to write, the more idea units they recalled, and this was as expected. There was a modest correlation between pretest Likert 1 (difficulty) and the pretest recall score (REC) (0.39 p <.01). There were several correlations among the pretest Likert scale items themselves, namely with item 4, interest. Item 4 was correlated with item 2 (memorability) (0.50, p <.001), with Likert item 3 (affect) (0.54, p <.001), with item 5 (back. know.) (0.46 p <.01), with item 6 (clarity of argum.) (0.44 p <. 01), with item 8 (recommend.) (0.71 p <.001), with item 9 (content) (0.78 p <.001) and with item 10 (discussion of content) (0.62 p <.001).

TABLE V

Matrix of Significant Correlations for All Variables for Pretest and Posttest

	REC	RT	WT	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10
recall (REC)		–[a]	56[b]***	39**	–	–	–	–	–	–	–	–	–
reading time (RT)	54***		–	–	–	–	–	–	–	–	–	–	–
writing time (WT)	52***	–		–	–	40**	34*	–	–	–	–	–	42**
Likert 1 (L1) (difficulty)	–	–	–		38**	35*	–	33*	–	–	–	–	–
Likert 2 (L2) (memorability)	–	–	–	54***		–	50***	–	–	–	37*	32*	48**
Likert 3 (L3) (affect)	–	–	–	37**	–		54***	49***	–	–	38**	39**	36**
Likert 4 (L4) (interest)	–	–	–	–	45**	48**		46**	44**	–	71***	78***	62***
Likert 5 (L5) (back. know.)	–	–	–	–	–	–	–		–	–	33*	–	–
Likert 6 (L6) (clarity of argu.)	–	–	–	–	–	–	42**	–		–	–	34*	34*
Likert 7 (L7) (organiz.)	–	–	–	–	37**	–	39**	–	66***		42**	33*	–
Likert 8 (L8) (recommen.)	–	–	44**	–	–	34*	62***	–	–	36**		79***	54***
Likert 9 (L9) (content)	–	–	–	–	–	42**	66***	–	–	–	60***		57***
Likert 10 (L10) (discussion of content)	–	–	–	–	–	52***	48**	–	–	–	41**	65***	

Note: UPPER DIAGONAL FOR PRETEST, LOWER DIAGONAL FOR POSTTEST

[a] correlations of 3 and below are represented in this manner

[b] to be read as two decimal places

*stands for $p < .05$

**stands for $p < .01$

***stands for $p < .001$

Likert item 8 (recommend.) was correlated with item 9 (content) (0.79 p <.001) and with item 10 (discussion of content (0.54 p <.001). Likert item 10 (discussion of content) was correlated with item 9 (content) (0.57 p <.001). There was a correlation between the posttest reading time (RT) and posttest recall (REC) (0.54 p <.001), unlike on the pretest. As on the pretest, there was a correlation between the posttest writing time (WT) and posttest recall (REC) (0.52 p <.001). This appears to be consistent from the pretest to the posttest. There was also a correlation between some of the posttest Likert items themselves. For example, Likert 1 (difficulty) was correlated with Likert 2 (memorability) (0.54 p <.001), unlike on the pretest. But as on the pretest, it was Likert item 4 (interest) which had the greatest number of correlations. Likert 4 was correlated with Likert 2 (memorability) (0.45 p <.01), with item 3 (affect) (0.48, p <.01), with item 6 (clarity of argum.) (0.42 p <.01), with item 7 (organization) (0.39 p <.01) with item 8 (recommen.) (0.62 p <.001), with item 9 (content) (0.66 p <.001) and with item 10 (discussion of content) (0.48 p <.01).

Likert item 8 (recommen.) was correlated with 9 (content) (0.60 p <.001) and with item 10 (discussion of content) (0.41 p <.01) as on the pretest. Note that item 7 (organization) was correlated with four other Likert items: 2, (memorability) 4 (interest), 6 (back. know.), and 8 (recommend.) unlike on the pretest where it was only correlated with items 8 (recommen.) and 9 (content). Subjects seemed more aware of item 7 on the posttest.

There seem to be several consistent correlations from the pretest to the posttest, with "interest", Likert item 4, providing the greatest number and some of the highest.

The Second Language Reading Test

A Pearson Product Moment Correlation was also computed on the second language reading test (L2T) and on reading time for this test (RTL2T), on the pretest (PREC) and posttest (PTREC) recall scores, on reading time (RT) for the pretest and on writing time (WT) for the pretest. This matrix is presented in Table VI.

TABLE VI

Matrix of Significant Correlations for the L2 Reading Test

	L2T	RTL2T	PREC	RT	WT
L2 Reading test (L2T)					
readtime L2 test (RTL2T)	33^{a*}				
pretrecall scores (PREC)	–^{b}	–			
prereading time (RT)	32^{a*}	58***	–		
prewriting time (WT)	–	34*	56***	–	
ptrecall scores (PTREC)	–	–	58***	–	50***

[a] negative correlations are underlined
[b] correlations of .31 and below are represented in this manner
[c] to be read as two decimal places
*stands for $p <.05$
***stands for $p <.001$

From Table VI it can be seen that the correlation for the pretest scores with the posttest scores was 0.58 (p <.001). Reading time for this reading test was correlated with reading time for the pretest (0.58 p <.001) and this was as expected. There was a negative correlation between this second language reading test and the reading time for it (-0.33, p <.05). This was unexpected. There was also a negative correlation between this test and the pretest reading time (-0.32, p <.05). The results of this second language reading test were not significantly correlated with either the pretest recall or the posttest recall.

Because there was a difference between the mean scores for the second language reading test for the control group (M=34.23) and for the experimental group (M=32.19), an ANOVA was carried out to see whether this represented a significant difference. These results were not significant (F (1,42)=1.68, p =0.202). There were thus no differences in second language reading ability between the two groups prior to the intervention.

All ANOVA tests in the present research were performed with an a priori significance level of .05.

The highest possible score on the second language reading test was 45. In the experimental group, six of the subjects whose scores ranged from 26-37 on this test, fell into group A at the beginning of the intervention, that is, they were able to write recalls with the given TLS and its appropriate signal words. This can be seen in Table VII.

TABLE VII
L2 Reading Test Scores and Letter Category Groupings for the Sample

Subject	**Reading Test Score**[a]	**Pretest Letter Category**	**Posttest Letter Category**
Experimental			
S27	31	A	A
S38	37	A	A
S39	37	A	A
S40	26	A	A
S41	34	A	A
S43	35	A	A
Control			
S3	40	A	A
S4	28	A	A
S11	34	A	C
S12	34	A	A
S13	35	A	A
S16	36	A	A
S17	34	A	A
S19	27	A	A
S20	32	A	D
S21	37	A	A

[a] score out of a total of 45

These subjects possessed the structure strategy. In the control group, 10 of the subjects whose reading test scores ranged from 27-40 were also seen to possess the structure strategy on the pretest. They were also in group A.

Meyer, Brandt and Bluth (1980) maintain that more proficient readers possess the structure strategy. Stanovich (1980) maintains that superior readers have superior strategies, as for example, the structure strategy, for comprehending and remembering large units of text.

After treatment in the experimental group, the same six subjects in group A remained there. Additionally, 12 other subjects fell into group A after treatment. In the control group, of the 10 subjects in group A at the beginning of the intervention, eight remained in group A. Two fell into lower groups. In other words, those subjects who were more proficient second language readers (after the results of the Second Language Reading Test), retained the structure strategy. Better readers seemed to possess the structure strategy. Those subjects already possessing this strategy did not benefit from treatment.

Research Hypotheses

Number of Idea Units Recalled

Recall scores fell between 109 (highest) and 12 (lowest) on the pretest. They fell between 113 (highest) and 11 (lowest) on the posttest. The highest possible score was 193 idea units as can be seen from the content structure of the two texts (see Appendix A).

It is clear from Table II, (see means for pretest letter and pretest number categories) that the subjects in the experimental group had less knowledge about TLS's and signal words at the beginning of the intervention than did those in the control group. Their pretest number category means were 5.24, and their pretest letter category means were 2.67 whereas for the control group their pretest number category means were 4.41 and their pretest letter category means were 2.32. Thus, subjects in the control and experimental groups did not start out with the same knowledge of TLS's and signal words and this situation could have influenced recall. H_1, H_2, H_3 and H_4 were formulated to reflect this reality.

These means, as given above, therefore, required adjustments. An ANCOVA was chosen as the type of analysis to be used. The dependent variable was the posttest recall score. The covariate was the pretest recall score. The ANCOVA would adjust the posttest means on the basis of the pretest means and then compare these adjusted means to see if they were significantly different from one another. The H. hypothesis associated with this analysis is that there is no difference among the adjusted means of the dependent variable. A signficant difference would be found if these adjusted means were far enough apart.

The use of the pretest recall scores as a covariate also provides a more powerful (sensitive) statistical analysis (Huck, Cormier, & Bounds, 1974). Note that the correlation between the pretest recall scores and the posttest recall scores was 0.58 (p <.001) (see Table VI). This correlation was sufficient to allow the inclusion of the covariate data (Huck, Cormier, & Bounds, 1974).

An ANCOVA was performed on the posttest recall scores for groups with the pretest recall scores as a covariate. These results are presented in Table VIII.

TABLE VIII

Summary of ANCOVA on Posttest Recall Scores for Groups with Pretest Recall Scores as a Covariate

Sour.	**SS**	***df***	**MS**	***F***	***p***
Pre recall scores	8436.277	1	8436.277	22.532	.000***
Group	1534.504	1	1534.504	4.098	.050*
Resid.	14976.335	40	374.408		
Total	24947.116	42	593.979		

*stands for $p \leq .05$
***stands for $p < .001$

Main effects were obtained for group (p ≤.05). There was also a significant effect for the covariate (p <.001). There was enough evidence to support the research hypothesis for this research, that is, there is a difference between training in the structure strategy and the number of idea units freely recalled from a given text. The adjusted means were far enough apart.

Additional Hypotheses

In order to examine the group effect more closely, two more ANCOVA's were performed. The first ANCOVA was performed on posttest number category (1-9) for groups with pretest number category as a covariate. These results appear in Table IX.

TABLE IX

Summary of ANCOVA on Posttest Number Category for Groups with Pretest Number Category as a Covariate

Source of Var.	**SS**	***df***	**MS**	***F***	***p* prob.**
Pretest num. cat.	82.546	1	82.546	17.427	.000***
Group	92.686	1	92.686	19.568	.000***
Resid.	189.466	40	4.737		
Total	364.698	42	8.683		

***Stands for *p* <.001

From Table IX, it can be seen that there was a strong, significant main effect for group (p <.001) and also for the covariate. The second ANCOVA was performed on posttest letter category for groups with pretest letter category as a covariate. Table X presents the results of the second ANCOVA.

TABLE X

Summary of ANCOVA on Posttest Letter Category for Groups with Pretest Letter Category as a Covariate

Source	**SS**	***df***	**MS**	***F***	***p* prob.**
Pre. Let. Categ.	13.906	1	13.906	14.548	.000***
Group	16.651	1	16.651	17.420	.000***
Resid.	38.234	40	.956		
Total	68.791	42	1.638		

***Stands for $p < .001$

Again, there was a strong, significant main effect for group (p <.001).

A Wilcoxon matched pairs signed ranks test was again performed as an extra check for reasons previously stated. This test was done by group. For the control group, there were no significant differences between the pretest number categories and the posttest number categories (2 tailed p =.5829). Additionally, for the control group, there were no significant differences between the pretest letter and the posttest letter categories (2 tailed p =.5536). For the experimental group, there were significant differences for both the pretest number categories and the posttest number categories (p <.001) as well as for the pretest letter categories and the posttest letter categories (p <.001).

Idea Units Recalled and Texts

The mean number of idea units recalled for the 'Fast Breeder Reactors' text and for the 'Anti S Proteins for Schizophrenics' text was examined. As an extra check, an independent samples t test was performed to detect the presence of significant differences between the means for idea units recalled for the control and experimental groups. The results of this t test are shown in Table XI.

TABLE XI
Independent Samples *t* Test on Mean Idea Units Recalled (SD) on the Pretest and the Posttest

Source	**M**	**Diff. Mean**	***t* val**	***df***	**2 tail prob.**
CONTROL GROUP					
Pretest recall	46.4091 (23.476)	8.5909 (16.689)	2.41	21	.025*
Posttest recall	37.8182 (18.832)				
EXPERIMENTAL GROUP					
Pretest recall	48.4286 (27.010)	-2.4762 (26.694)	-.43	20	.675
Posttest recall	50.9048 (27.982)				

*Stands for $p < .05$

It can be seen from Table XI that there was a significant loss (t (21) = 2.41, p <.05) for the control group in the number of idea units recalled from the pretest (M=46.4091) to the posttest (M = 37.8182).

A second independent samples t test was performed on the means for idea units recalled for both groups on the pretest and posttest for both texts. These results are shown in Table XII.

It can be seen from Table XII that for the pretest for the 'Fast Breeder Reactors' text, the mean number of idea units recalled for the control group was 49.9091, and it was 61.2000 for the experimental group. For the posttest for the 'Fast Breeder Reactors' text, the mean number of idea units recalled for the control group was 35.2727 and it was 44.5000 for the experimental group. Both groups recalled significantly fewer idea units for the

'Fast Breeder Reactors' text on the posttest. For the control group for this text, there was a significant loss, t (10) = 2.56, $p \leq .05$, in the mean number of idea units recalled from the pretest to the posttest. For the experimental group for the 'Fast Breeder Reactors' text, there was also a significant loss, t (g) = 2.24, $p \leq .05$.

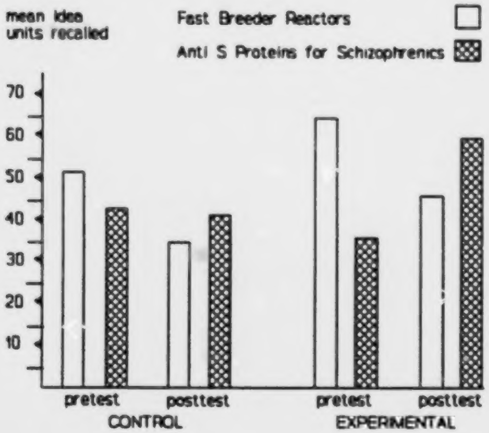
TABLE XII
Independent Samples *t* Test on Mean Number of Idea Units Recalled (SD) on the Pretest and Posttest for Both Texts

	CONTROL		EXPERIMENT.	
Source of Variation	**pre**	**post**	**pre**	**post**
Fast Breeder Reactors				
Mean	49.9091 (31.431)	35.2727 (20.838)	61.2000 (27.478)	44.5000 (18.916)
Difference Mean	14.6364 (18.943)		16.7000 (23.552)	
t value	2.56		2.24	
df	10		9	
2 tail.	.028*		.052*	
Schizophrenics				
Mean	42.9091 (11.937)	40.3636 (17.212)	36.8182 (21.637)	56.7273 (34.141)
Difference Mean	2.5455 (12.069)		-19.9091 (14.963)	
t value	.70		-4.41	
df	10		10	
2 tail.	.500		.001**	

*Stands for $p \leq .05$
**Stands for $p < .001$

For the pretest for the 'Schizophrenics' text, the mean number of idea units recalled for the control group was 42.9091. For the posttest for the control group, the mean number of idea units recalled was 40.3636. There was a loss, but it was not significant. For the experimental group for the 'Schizophrenics' text, the mean number of idea units recalled for the pretest was 36.8182, and for the posttest, 56.7273. There was a strong, significant gain, t (10) = -4.41, p <.001. This information is pictured in Figure 4.

Figure 4
Mean Number of Idea Units Recalled Per Text



Reading Time

Reading time was considered as another dependent variable, an indication of text processing, that is, the more time spent reading, the more the macrostructure of the text was developed. Note that no significant correlations were found between the pretest recall scores and the pretest reading time (see Table VI). An ANOVA on reading time for the pretest for both texts and for the posttest for both texts was carried out to see whether there were any significant differences. There were none either for the pretest (*F* (1,41) =1.60, p =0.213) or for the posttest (*F*(1,41) =.237, p = 0.629). The control group did not read either text significantly faster than did the experimental group either for the pretest or for the posttest.

Reader Assessment of Text Measure

This was another dependent variable. Table XIII presents the means for each of the 10 Likert scale items for the pretest and for the posttest for both the 'Fast Breeder Reactors' text and the 'Anti S Proteins for Schizophrenics' text. Note that each Likert scale moved from 1 (negative) to 5 (positive). These scale options constituted one dependent variable. Table XIII also presents the results of ANOVAS for each scale for the pretest and for the posttest for both texts.

Table XIII

Descriptive Statistics and Summary of ANOVA

Lik. item	Time	BR Mean	Schis Mean	*F**	*p* prob.
1 diff.	pre	3.14	2.55	4.909	.032*
	post	2.64	2.71	.114	.737
2 mem.	pre	2.48	2.64	.350	.558
	post	2.59	2.33	.860	.359
3 affect	pre	3.57	3.55	.007	.909
	post	3.32	3.33	.008	.931
4 inter.	pre	2.52	3.27	4.444	.041*
	post	2.91	2.52	1.765	.191
5 back.	pre	2.10	1.50	4.183	.047*
know.	post	1.95	1.67	.921	.343
6 clari.	pre	3.24	3.73	3.742	.060
argu.	post	3.41	3.14	.921	.343
7 organ.	pre	3.76	3.77	.002	.964
	post	3.77	3.62	.338	.564
8 recom.	pre	3.00	3.59	3.394	.073
	post	3.32	3.10	.970	.331
9 cont.	pre	2.62	3.64	8.760	.005**
	post	2.91	2.86	.025	.876
10 discu.	pre	2.81	3.45	4.293	.045*
cont.	post	3.00	3.24	.597	.444

**df* (1,41)
*Stands for $p < .05$
**Stands for $p < .01$

Item number 1 – DIFFICULTY

Subjects were asked: "How difficult was this text for you to read and understand?

very difficult	somewhat difficult	of average difficulty	not too difficult	easy
1	2	3	4	5

For item 1 above, Table XIII reveals that, in general, the sample said that the 'Fast Breeder Reactors' text (M=3.14) was easier to read on the pretest than on the posttest (M= 2.64). The opposite was true for the 'Anti S Proteins for Schizophrenics' text, that is, the sample said it was easier to read on the posttest (M =2.71) than on the pretest (M = 2.55). On the pretest, significant differences (p = .032) were found for difficulty.

Item Number 2 – MEMORABILITY

Subjects were asked: How difficult do you think this text will be for you to remember?

very difficult	somewhat difficult	of average difficulty	not too difficult	easy
1	2	3	4	5

For memorability, the 'Fast Breeder Reactors' text was perceived as harder to remember on the pretest (M =2.48) than on the posttest (M=2.59). For the 'Anti S Proteins for Schizophrenics' text, the opposite held true, that is, it was perceived as harder to remember on the posttest (M =2.33) than on the pretest (M =2.64). There were no significant differences for text memorability.

Item Number 3 – AFFECT

Subjects were asked: "What are your feelings regarding the content of this text?"

strong. disagree.	disagreement	neutral	agreement	strong agree.
1	2	3	4	5

For affect, for the 'Fast Breeder Reactors' text, the sample said they had stronger feelings toward this text, that is, they said they agreed more with its content, on the pretest (M=3.57) than on the posttest (M =3.32). They also said they agreed more with the content on the 'Schizophrenics' text on the pretest (M 3.55) than on the posttest (M =3.33). There were no significant differences for affect.

Item Number 4 – INTEREST

Subjects were asked: "How interesting did you find this text to read?"

totally uninteres.	somewhat interesting	interesting	quite interest.	very interest.
1	2	3	4	5

For interest, subjects said they were more interested in the 'Fast Breeder Reactors' text on the posttest (M = 2.91) than on the pretest (M =2.52). For the 'Schizophrenics' text, subjects said they were were more interested in it on the pretest (M 3.27) than on the posttest (M =2.52).

On the pretest, significant differences (p = .041) were found for interest.

Item Number 5 – BACKGROUND KNOWLEDGE

Subjects were asked: "How much background knowledge do you think you had in this subject area?"

very little	some	an aver. amount	a fair amount	quite a lot
1	2	3	4	5

Subjects felt they had more background knowledge for the 'Fast Breeder Reactors' text on the pretest (M =2.10) than on the posttest (M = 1.95). But they had more of it for the 'Schizophrenics' text on the posttest (M =1.67) than on the pretest (M =1.50). On the pretest, significant differences (p = .047) were found for background knowledge. Note that the means for background knowledge for the 'Schizophrenics' text on both the pretest and the posttest are the lowest means of all of the Likert scale items.

Item Number 6 – CLARITY OF ARGUMENT

Subjects were asked: "How clear was the main line of thought or the main argument of the text?"

unclear	somewhat clear	moderately clear	mostly clear	very clear
1	2	3	4	5

For the 'Fast Breeder Reactors' text, subjects perceived its main line of argument as clearer on the posttest (M =3.41) than on the pretest (M =3.24) whereas for the 'Schizophrenics' text, its main line of argument was perceived as being clearer on the pretest (M =3.73) than on the posttest (M =3.14). No significant differences were found for clarity of argument.

Item Number 7 – ORGANIZATION

Subjects were asked: "How organized do you think the text was that you read?"

unorganized	somewhat organized	moderately organ.	mostly organ.	very organ.
1	2	3	4	5

For the 'Fast Breeder Reactors' text, subjects perceived its organization to be similar on the pretest (M =3.76) and on the posttest (M =3.77). For the 'Schizophrenics' text, subjects perceived it to be more organized on the pretest (M= 3.77) than on the posttest (M = 3.62). No significant differences were found.

Item Number 8 — RECOMMENDATIONS

Subjects were asked: "Would you recommend this text to a classmate?"

strong disagree.	disagreement	neutral	agreement	strong agree.
1	2	3	4	5

Subjects said they would recommend the 'Fast Breeder Reactors' text more on the posttest (M = 3.32) than on the pretest (M = 3.00). But for the 'Schizophrenics' text, subjects said they would recommend it more on the pretest (M = 3.59) than on the posttest (M = 3.10). No significant differences were found.

Item Number 9 — CONTENT

Subjects were asked: "Would you like to read another text like this one on the same subject?"

strong disagree.	disagreement	neutral	agreement	strong agree.
1	2	3	4	5

For the 'Fast Breeder Reactors' text, subjects said they would like to read another text like it more on the posttest (M = 2.91) than on the pretest (M = 2.62) whereas for the 'Schizophrenics' text, they preferred its content on the pretest (M= 3.64) more than on the posttest (M = 2.86). On the pretest, significant differences (p = .005) were found for content.

Item Number 10 – DISCUSSION OF CONTENT

Subjects were asked: "Would you be interested in discussing the content of this text?"

strong disagree.	disagreement	neutral	agreement	strong agree.
1	2	3	4	5

For the 'Fast Breeder Reactors' text, more of the subjects felt inclined to discuss it on the posttest ($M = 3.00$) than on the pretest ($M = 2.82$). But for the 'Schizophrenics' text, more subjects felt inclined to discuss its content on the pretest ($M = 3.45$) than on the posttest ($M = 3.24$). On the pretest, significant differences ($p = .045$) were found for discussion of content.

Because significant differences had been found for some of the Likert items on the pretest, that is, for difficulty, interest, background knowledge, content and discussion of content, (See Table XIII) Pearson correlation coefficients were computed for all variables for the Fast Breeder Reactors text for both the pretest and posttest. This matrix of correlations is presented as Table XIV in Appendix I. Note that the pretest correlations are presented in the upper diagonal whereas the posttest correlations are to be found in the lower diagonal.

Prerecall scores (REC) were correlated with prewriting time (WT) (0.60 $p<.01$), with Likert 1 (difficulty) (0.36, $p<.05$,) with Likert 2 (memorability) (0.53, $p<.01$,) with Likert 4 (interest) (0.36, $p<.05$), with Likert 9 (content) (0.34) and with Likert 10 (discussion of content) (0.36, $p<.05$). Prereading time (RT) was negatively correlated with Likert 1 (difficulty) (-0.32). This was a very modest correlation and was unexpected. It was, however, consistent with the fact that there were no significant correlations found for reading time and pretest recall (see Table VI). Prewriting time (WT) was correlated with Likert 2 (memorability) (0.36, $p<.05$), with Likert 3 (affect) (0.64 $p<.01$), with Likert 4 (interest) (0.64 $p<.01$) with Likert 5 (back. know.) (0.43, $p<.05$) and with Likert 6 (clarity of argum.) (0.39 p

<.05) and was also correlated with items 8 (recommen.) (0.45, *p* <.05), 9 (content) 0.42, *p* <.05), and with 10 (discuss. of content) 0.62, *p* <.01). Likert 4 (interest) had the greatest number of correlations and some of the highest; for example, it was correlated with Likert 8 (recommend.) (0.77 *p* <.001) and with Likert 9 (content) (0.78 *p* <.001).

For the 'Fast Breeder Reactors' text on the posttest, there were fewer and more modest correlations, but some of the same Likert scale items namely, 4 (interest), 8 (recommend.), 9 (content) and 10 (discussion of content appeared to have as many correlations as on the pretest. Note that items 4 (interest), 9 (content) and 10 (discussion of content) were among those presenting significant differences (see Table XIII).

Table XV presents a matrix of correlations for the 'Anti S Proteins for Schizophrenics' text for both the pretest and posttest. It can be found in Appendix J. Note that the pretest correlations are presented in the upper diagonal whereas the posttest correlations are to be found in the lower diagonal.

Some of the same general tendencies are apparent for this text as have been seen for the 'Fast Breeder Reactors' text. For example, there were more correlations on the pretest than on the posttest and they tended to be higher. Further, there were even fewer correlations for the 'Schizophrenics' posttest. The same Likert scale items were correlated many times on both the pretest and posttest, for example, Likert items 4 (interest), 5 (back. know.), 8 (recommend.), 9 (content) and 10 (discussion of content). Note again that items 4, 9 and 10 were among those presenting significant differences (see Table XIII).

There were more negative correlations for the 'Schizophrenics' text than for the 'Fast Breeder Reactors' text.

Stated more specifically, on the pretest, the subjects found the 'Fast Breeder Reactors' text easier to read but harder to remember. Note that this text had a readability measure of 30. What the subjects found appears rather contradictory. They had stronger feelings for this text on the pretest than on the posttest. They claimed to have more background knowledge for it on the pretest. They found this text to have similar organization on both the pretest and posttest. They found this text more interesting and said its argument was clearer on the posttest, yet they recalled fewer idea units from it at this time. They said they would recommend it more, were more satisfied with its content and wanted to discuss it more on the posttest. Yet, again, they recalled fewer idea units from it at this time. This appears contrary to what one would expect.

The subjects found the 'Schizophrenics' text easier to read yet harder to remember on the posttest – the opposite of what had been found for the 'Fast Breeder Reactors' text. Note that this text measured 27 for readability. Yet, they recalled significantly more idea units for the 'Schizophrenics' text on the posttest. They claimed to have strong feelings for this text on the pretest, as for the 'Fast Breeder Reactors' text. They said they had more background knowledge for 'Schizophrenics' on the posttest. But, in fact, they had very little background knowledge at all for the 'Schizophrenics' text. On the pretest, they found it more interesting, its argument was clearer, its organization was better, they recommended it more and agreed more with its content. Yet, they recalled fewer idea units from it at this time. Again, this seems contrary to what one would expect.

Thus, from the results of the Likert scale items, the 'Fast Breeder Reactors' text and the 'Schizophrenics' text were perceived as different by the sample.

Chapter V

Discussion

This study investigated the effects of training in the structure strategy on the recall of expository prose for university students reading French as a second language. Subjects also completed 10 Likert scales designed to estimate text difficulty, memorability, affect, interest, background knowledge, clarity of argument, organization, recommendations, content and discussion of content.

This chapter discusses the findings reported in Chapter IV by considering: (a) the main and additional research hypotheses (b) reading time and (c) text content.

The Effects of Training in the Structure Strategy on the Number of Idea Units Recalled

Meyer (1979) maintains that in English the use of TLS's by skilled readers is operational upon encoding and also upon retrieval, that is, when a reader is asked to recall a text. If this reader uses the same TLS during recall as was used during the encoding of the propositions of the original text, that is, if this reader applies the structure strategy, this reader will recall more of the idea units from the text than those readers who can not or do not use it. Meyer and Freedle (1984) stated that the structure strategy is the most efficient for most school learning when the goal is to discover the writer's message. There are also times when using the writer's TLS is inefficient, as for example, when scanning for a detail or when the reader disagrees with the writer.

After treatment, the experimental group in the present study recalled significantly more idea units from the 'Schizophrenics' text. There was a significant effect for group ($p \leq .05$).

There was not enough evidence to support the additional hypotheses of the present research. Subjects in group A (H_1) were those identified as possessing the structure strategy before the intervention; those in the experimental condition did not benefit from the treatment. Further, they did not recall more idea units after treatment. However, like control group A subjects, they retained the structure strategy from the pretest to the posttest. For experimental subjects in groups C and D, (H_3, H_4), more of them were familiar with TLS's and signal words and could organize their recalls using both. Thus, those experimental subjects who had not learned or acquired or internalized TLS's and signal words before experimentation benefited from the treatment. The differences were not, however, significant. There was not enough evidence to support H_3 and H_4. Control group C and D subjects mostly remained in groups C and D.

It may be that in first language reading, the structure strategy belongs to the constellation of reading strategies used by more skilled readers as Meyer, Brandt and Bluth (1980) have claimed. It may also be that it belongs to a similar constellation of second language reading strategies. It is possible that subjects who possessed this strategy at the beginning of the intervention (group A subjects) transferred it from their first language, English, to French, their second language. There are some second language reading strategy researchers who claim that the development of strategy use is a stable phenomenon which transfers from the first to the second language (Block, 1986; Sarig, 1987) or that it transfers from the second language to the first (Levine & Reves, 1985). It is also possible that these group A subjects somehow acquired and/or internalized this strategy through their reading or through instruction in French. It would be difficult to establish how these subjects came to possess this strategy. One fact is clear, however. Most subjects who possessed the structure strategy at the beginning of the intervention, whether in the experimental or control group, retained it after the intervention. And these subjects were the more proficient second language readers according to the second language reading test.

The Effect of Reading Time on the Recall of Idea Units

No main effect for reading time on the recall of idea units was found. Although reading time is often considered to be a measure of text processing, or macrostructure formation (Kintsch & Keenan, 1973; Kintsch & Vipond, 1979; Vipond, 1980), the present research did not demonstrate this. There were no significant correlations found between pretest recall scores and pretest reading time. There was only a modest correlation between posttest recall scores and posttest reading time. No significant differences were found for reading time on the pretest or the posttest. That is, the time required to read the texts was not related to the number of idea units recalled either for the pretest or for the posttest. Note that Horowitz (1982, p. 106) did not obtain a main effect for reading rate and text.

It is possible that the subjects in this study simply did not require more reading time. Note that these subjects knew they could take as much time as they needed. Perhaps much of the pressure of both the pretest and the posttest was removed because of this. Their anxiety levels were down. They relaxed and monitored their reading time efficiently.

The Influence of Text Content on Readers

In the present research, there were certain controls on the texts in English and in French. The two texts, 'Fast Breeder Reactors' and 'Anti S Proteins for Schizophrenics' have identical content structures in French and in English, the language of recall. The two texts are linguistic clones. It has been mentioned that the 'Fast Breeder Reactors' text is an original text taken from the *Scientific American* and that the 'Schizophrenics' text is its clone. In English, the two texts have the same number of idea units (193). The 'Fast Breeder Reactors' text has 506 words; the 'Schizophrenics' text has

638 words. In French, the two texts have the same readability level (27-30). Meyer claims that these two texts are equal and produce equal recall.[1]

There were significant differences in the number of idea units recalled from these two texts (p <.001). In the present study, on the pretest, 'Fast Breeder Reactors' and 'Anti S Proteins for Schizophenics' were judged as significantly different on difficulty (Likert scale 1), interest (Likert scale 4), background knowledge, (Likert scale 5), content (Likert scale 9) and discussion of content (Likert scale 10). Note, however, that interest in the 'Schizophrenics' text *lessened* on the posttest whereas interest in the 'Fast Breeder Reactors' text heightened on the posttest. In this case, heightened interest did not necessarily lead to greater recall.

When examining the differences in the mean number of idea units recalled from the pretest to the posttest, it is clear that the control group recalled fewer idea units from both the 'Fast Breeder Reactors' text and the 'Schizophrenics' text. In training studies such as the present research, there always exists the possibility of the Hawthorne effect – a tendency for subjects to act differently because they realize they are subjects in a study. At the beginning of the intervention the researcher told the two groups in this study that they had been selected to participate in it. It would appear that the control group underwent some type of mid semester burn out. This assumption would help to explain the significant loss in the mean number of idea units recalled from the pretest to the posttest for the 'Fast Breeder Reactors' text and the non significant loss for the 'Schizophrenics' text.

For the experimental group, there was a significant loss in the mean number of idea units recalled for the 'Fast Breeder Reactors' text from the pretest to the posttest. It can be supposed that the subjects in the experimental group also underwent a type of mid semester burnout which would help to explain this loss. But there was a strong, significant gain in the mean number of idea units recalled for the ' Schizophrenics' text.

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[1] Meyer, personal communication.

Horowitz (1982) obtained a main effect for text content in her study. A text on "Body Water" resulted in a significantly greater mean recall (p <.01) than a second text on "Social Spiders" Roen (1984) obtained a significant effect for text content. Subjects reading a text on "Neanderthal Man" recalled significantly (p <.001) more idea units than from a second text on "Neolithic Farming". Roen and Piché (1984) used two texts taken from the *Scientific American.* Again, text topic was significant (p <.001). In the present study, subjects recalled significantly more (p <.001) idea units from the 'Schizophrenics' text than from the 'Fast Breeder Reactors' text.

Meyer (1975a; 1977a; Meyer et al., 1982) has claimed that the form, or the TLS, and signal words of a text are independent of content. Olhausen and Roller (1988) and van Dijk (1981) have made the same claim. For her part, Horowitz stated:

> It is possible that certain rhetorical predicates used by writers are the generators of text content; however, it is also possible that the form of the text follows the topic, content and overall intention (goal) of the message. (1982, p. 46)

Horowitz claims that the four "Body Water" passages (passages with the same content but four different TLS's) used in Meyer and Freedle's study (1984), in her own study (1982) and in Carrell's study (1984), may have a propensity for the adversative (comparison) TLS. She (1982, p. 134) claims that the effects of TLS's may, therefore, be limited by text content. This particular claim is also stated in Pearson and Camperell (1985, p. 339). Roen (1984) agrees with Horowitz' claim and adds that certain textual features such as the problem solution TLS may be "peculiar to the situation" (p. 24). It is possible that the 'Anti S Proteins for Schizophrenics' was perceived as different because its content may not lean toward the problem solution TLS.

Further, subjects in the present study admittedly had very little background knowledge for the 'Schizophrenics' text, that is, they were not familiar with its content. Recall that the mean for background knowledge was the lowest of all the Likert scale items. Olhausen and Roller (1988) investigated fifth, seventh and ninth graders as well as university students reading three passages. The first was constructed so as to allow the use of both content and formal schemata. The second passage discouraged the use of the formal schema (TLS) in question, in this case a description TLS. All four types of signals as given in Meyer (see chapter I of this study) were removed and all remaining sentences were scrambled. The third passage discouraged the use of a content schema, in this case the concept of ***nation*** in that all words referring to nation such as land, geography, history, people, economics etc. were replaced with nonsense words. Olhausen and Roller discovered that the adults in their study did not make use of the available formal schema (description) when they were familiar with the content schema of nation. However, when these adults found the content difficult to understand, they seemed to use their formal schema for the text. In other words, formal schemata operate in different ways depending on the difficulty or familiarity of the text (p. 86).

Horowitz (1982, p. 142) has proposed that "Where topic is highly unfamiliar, there is likely to be greater need for a higher order rhetorical predicate". In other words, the use of TLS, or the structure strategy, depends on text content. The experimental subjects in this study were more familiar with the content of the 'Fast Breeder Reactors' text; they did not need to use the structure strategy when reading and recalling it. But when the content was largely unfamiliar as in the 'Schizophrenics' text, they used the structure strategy and recalled more idea units because of its use. This would explain the strong, significant gain observed for recall for this text for the experimental group. It would also help to explain why the sample perceived the 'Fast Breeder Reactors' text and the 'Schizophrenics' text as different on the pretest but not on the posttest.

Roen and Piché stated:

> It may be that the effects of response rhetorical predicates (read problem solution TLS) as well as those of other types of rhetorical predicates are so highly context bound that they cannot be predicted across different text types or topics. (1984, p. 20)

This is what occurred in the present research.

In summary, the present research demonstrated that:

(a) text topic was significant and because of this, the effects of training in the structure strategy can not be predicted across text topics;

(b) the more proficient readers seemed to possess the structure strategy prior to the intervention; those subjects who did not possess it and were taught to use the structure strategy improved their recall;

(c) the structure strategy is eminently teachable; it appeared to have lasting effects since the posttest occurred one month after the training ended;

(d) reading time was not significantly related to recall;

(e) longer passages like 'Fast Breeder Reactors' and 'Schizophrenics' seemed to offer no disadvantages.

Implications for Future Research

While it is true that many of the subjects in the sample were unfamiliar with the signal words and TLS's of French, it can be supposed that they were familiar with the concepts of TLS's and signal words and their realizations in English, their first language, if as has been stated previously, both of these are somehow acquired by the native speaker. They were thus familiar with the *concepts* of description, comparison, causation, problem solution and sequence, five of the most frequently occurring TLS's (Meyer, 1975a) in English.

O'Malley and Chamot (1990, p. 192) referred to the transfer of both declarative knowledge and procedural knowledge from the first to the second language. Strategies begin as declarative (conscious) knowledge that can become proceduralized (automatic) with practice. They state:

> Another concern related to transfer is the effect of cultural experiences on the development of various types of schemata, and the ease or difficulty with which a culturally influenced story grammar, event structure, or discourse organization schema might accommodate new information of this type learned in the second language" (O'Malley & Chamot, 1990, p.192).

This aspect represents an important concern for future studies.

Researchers are still very far away from asserting that a description TLS or a comparison TLS or any other TLS in English is realized in the same way or in a similar way in French. Text type research of this kind is truly in its infancy. Grabe (1987) has begun to furnish findings on the definitions of expository text types in English, but he is still at the definition stage. Researchers will one day be able to compare TLS's in French and in English, but this is still a long way off.

Only six of the subjects in the sample were males. It is possible that sex differences have a role to play in strategy use. Oxford, Nyikos and Ehrman (1988) have shown that females use more strategies and a wider range of strategies than do males. Women, it seems, display greater social orientation and have a greater desire for social approval than do males.

It has been mentioned that all subjects in the present study were paid for their participation in the experiment. It is possible that motivation also has a role to play in strategy use. Oxford and Nyikos

(1989) found that motivation, both type and intensity, greatly influenced strategy use. O'Malley and Chamot (1990, p. 168) stated that motivation is probably the most important characteristic that students bring to a learning task.

Environment can also influence strategy choice (Oxford, Nyikos & Ehrman, 1988, p. 324). In the present study, the intervention began at the beginning of February and ended in the middle of March.

Future research could use the same training program as in the present study but with a larger sample so that the additional hypotheses can be tested. It would be also interesting to extend the training period to investigate whether increasing the five hours of training in TLS's, that is, in the structure strategy, has any effect. In this case, modifications to the training program could include more texts with less obvious but still evident TLS's.

The present research was limited to high intermediate French as a second language subjects. Strategies may interact with language proficiency as has been considered previously. Different strategies may be appropriate at different knowledge levels. In Kern's study (1989) low ability subjects seemed to respond more favorably to strategic training. Oxford and Nyikos (1989) found that subjects' self perceptions of proficiency greatly influenced strategy use. Future research could examine less proficient French as a second language readers and training in the structure strategy to investigate whether there is a language ceiling necessary before this training can be successfully introduced.

In the present study, reading time was not related to text processing, contrary to what was expected. Reading time may be related to language proficiency.

Less proficient readers may simply require more time. If such is the case, then reading time could be related to text processing. Reading time may be related to learning style, for example, field dependence or independence. A learning style may predispose a learner to adopt a particular strategy. More studies like that of Carrell et al. (1989) are needed.

Reading time may also be related to purpose in reading. In the present study, subjects were given a purpose for reading which was to take notes for an absent classmate. This purpose may have influenced reading time.

Only future research can provide the answers to all of the above.

In the present research, two 'linguistically' equal texts were used to establish pretest posttest reliability and to produce equal recall. It is always very difficult to establish the equivalency between two texts. The other alternative is, of course, to use the same text on the pretest and the posttest. In this case, researchers always have to contend with the effects of practice (Horowitz, 1982; Meyer, Young & Bartlett, 1989, p. 83) and also with the effects of repeated exposure to a text (Frederiksen, 1975a, 1975b; Kintsch, 1982) both of which were avoided in the present study through the use of two texts.

Future research could include more comprehensive Likert scales to help shed light on how readers perceive content. Horowitz (1982), Carrell (1983, 1989), and Carrell and Wallace (1982) had appended Likert scales to the texts used in their studies. However, these studies were not training studies as was the present research.

The present study has shown that TLS's may not be needed under certain conditions, that is, they are used as text content warrants. In future studies, it will not be the singular effect of TLS's on second language reading performance, but their interaction and variability that will need to be investigated. It is indeed difficult to study this interaction in second language reading performance until researchers know that second language subjects possess the structure strategy. Recall that only 16 out the total 43 subjects in the sample possessed this strategy prior to the intervention. More training studies are thus required. The present research represents a step in this direction.

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Appendix A

Texts and Their Content Structures

FAST BREEDER REACTORS

The need to generate enormous additional amounts of electric power while at the same time protecting the environment is taking form as one of the major social and technological problems that our society must resolve over the next few decades. The Federal Power Commission has estimated that during the next 30 years the Canadian power industry will have to add some 1,600 million kilowatts of electric generating capacity to the present capacity of 300 million kilowatts. As for the environment, the extent of public concern over improving the quality of air, water and landscape hardly needs elaboration, except for one point that is often overlooked: it will take large amounts of electrical energy to run the many kinds of purification plants that will be needed to clean up the air and water and to recycle wastes.

A related problem of equal magnitude is the rational utilization of the nation's finite reserves of coal, oil and gas. In the long term they will be far more precious as sources of organic molecules than as sources of heat. Moreover, any reduction in the consumption of organic fuels brings about a proportional reduction in air pollution from their combustion products.

The breeder type of nuclear reactors holds great promise as the solution to these problems. Breeder reactors produce more nuclear fuel than they consume; they would make it feasible to utilize enormous quantities of low-grade uranium and thorium ores dispersed in the rocks of the earth as a source of low-cost energy for thousands of years. In addition, these reactors would operate without adding noxious combustion products to the air. It is in the light of these considerations that the Atomic Energy commission, the nuclear industry and the electric utilities have mounted a large-scale effort to develop the technology whereby it will be possible to have a breeder reactor generating electric power on a commercial scale by 1994.

Nuclear breeding is achieved with the neutrons released by nuclear fission. The fissioning of each atom of a nuclear fuel, such as uranium 235, liberates an average of more than two fast (high-energy) neutrons. One of the neutrons must trigger another fission to maintain the nuclear chain reaction; some neutrons are nonproductively lost, and the remainder are available to breed new fissionable atoms, that is, to transform "fertile" isotopes of the heavy elements into fissionable isotopes. The fertile raw materials for breeder reactions are thorium 232, which is transmuted into uranium 233, and uranium 238, which is transmuted into plutonium 239.

It has been mentioned that breeding occurs when more fissionable material is produced than is consumed. A quantitative measure of this condition is the doubling time: the time required to produce as much net additional fissionable materials as was originally present in the reactor. At the end of the doubling time the reactor has produced enough fissionable material to refuel itself and to fuel another identical reactor. An efficient breeder reactor will have a doubling time in the range of from seven to ten years. (Meyer, 1975a)

CONTENT STRUCTURE

Fast Breeder Reactors

LEVELS OF THE CONTENT STRUCTURE

TLS 1	2	3	4	5	6	7	8
1	*response*						
2	*problem*						
3	*collection*						
4	NEED TO GENERATE ELECTRIC POWER						
5		*specific*					
6		*Add*					
7			agent				
8			CANADIAN POWER INDUSTRY				
9			patient				
10			1600 MILLION KILOWATTS OF ELECTRIC GENERATING CAPACITY				
11			benefactive				
12			***IS PRESENT CAPACITY***				
13				patient			
14				300 MILLION KILOWATTS			
15			*setting time*				
16			NEXT 30 YEARS				
17			***ESTIMATED***				
18				agent			
19				FEDERAL POWER COMMISSION			
20	PROTECT ENVIRONMENT						
21		*specific*					
22		***IMPROVE QUALITY***					
23			agent				
24			PUBLIC				
25				*attribution*			
26				CONCERN OVER IMPROVING ENVIRONMENT			
27			patient				
28			*collection*				
29			AIR				
30			WATER				

KEY

CAPITALIZED WORDS = CONTENT WORDS FROM THE TEXT

CAPITALIZED WORDS IN ITALICS = WORDS FROM THE TEXT SERVING AS LEXICAL PREDICATES

underlined, lower case words = *rhetorical predicates*

lower case words = roles

- 31 LANDSCAPE
- 32 latter
- 33 *collection*
- 34 CLEAN AIR
- 35 CLEAN WATER
- 36 RECYCLED WASTES
- 37 instrument
- 38 PURIFICATION PLANTS
  - 39 *attribution*
  - 40 MANY KINDS
  - 41 ***RUN***
    - 42 force
    - 43 ELECTRICAL ENERGY
      - 44 *specific*
      - 45 LARGE AMOUNTS OF ELECTRICAL ENERGY

- 46 RATIONAL UTILIZATION OF FINITE RESERVES
  - 47 *setting location*
  - 48 NATION
  - 49 *specific*
  - 50 *collection*
  - 51 COAL
  - 52 OIL
  - 53 GAS
  - 54 *explanation*
  - 55 SOURCES OF ORGANIC MOLECULES
    - 56 *adversative*
    - 57 SOURCES OF HEAT
    - 58 *setting time*
    - 59 IN THE LONG TERM
  - 60 ***REDUCE CONSUMPTION***
    - 61 patient
    - 62 ORGANIC FUELS
    - 63 latter
    - 64 ***REDUCE AIR POLLUTION***
      - 65 *manner*
      - 66 PROPORTIONALETY
      - 67 former
      - 68 COMBUSTION PRODUCTS
- 69 *solution*
- 70 BREEDER REACTORS
  - 71 *identification constituency*
  - 72 TYPE OF NUCLEAR REACTOR
  - 73 *explanation*
  - 74 *covariance, antecedent*
  - 75 *collection*
  - 76 ***PRODUCE***
    - 77 patient
    - 78 FUEL
    - 79 latter
    - 80 MORE FUEL THAN CONSUME
    - 81 *specific*
    - 82 BREEDING OCCURS WHEN MORE FISSIONABLE PRODUCED THAN CONSUMED
      - 83 *explanation*
      - 84 QUANTITATIVE MEASURE IS THE DOUBLING TIME
        - 85 *specific*

```
 86                     TIME REQUIRED RO PRODUCE AS MUCH NET ADDITIONAL
                        FISSIONABLE MATERIAL AS WAS ORIGINALLY PRESENT IN REACTOR
 87                         explanation
 88                         PRODUCE
 89                             force
 90                             REACTOR
 91                             setting time
 92                             END OF THE DOUBLING TIME
 93                             latter
 94                             collection
 95                             ENOUGH FISSIONABLE MATERIAL TO REFUEL ITSELF
 96                             ENOUGH FISSIONABLE MATERIAL TO REFUEL ANOTHER
                                IDENTICAL REACTOR
 97                     attribution
 98                     DOUBLING TIME RANGES FROM 7 TO 10 YEARS FOR EFFICIENT
                        BREEDER REACTOR
 99 USE
100     manner
101     ENORMOUS QUANTITIES
102     patient
103     collection
104         setting location
105         DISPERSED IN ROCKS OF THE EARTH
106     LOW-GRADE URANIUM ORE
107     LOW-GRADE THORIUM ORE
108     latter
109     LOW COST ENERGY
110     setting time
111     THOUSANDS OF YEARS
112 OPERATE
113     latter
114     WITHOUT ADDING NOXIOUS COMBUSION PRODUCTS
115     benefactive
116     AIR
117 covariance. consequent (IN LIGHT OF THESE CONSIDERATIONS)
118 EFFORT MOUNTED
119     agent
120     collection
121             ATOMIC ENERGY COMMISSION
122     NUCLEAR INDUSTRIES
123     ELECTRIC UTILITIES
124     manner
125     LARGE-SCALED
126     latter
127     GENERATE
128         force
129         BREEDER REACTOR
130         patient
131         ELECTRIC POWER
132         range
133         COMMERCIAL SCALE
134         setting time
135         1997
136     attribution
137     NUCLEAR BREEDING OCCURS
```

- 138 force
- 139 NUCLEAR FISSION
- 140 patient
- 141 ATOME OF NUCLEAR FUEL
  - 142 *explanation*
  - 143 URANIUM
    - 144 *specific*
    - 145 (URANIUM) 235
- 146 latter
- 147 LIBERATES NEUTRONS
  - 148 *specific*
  - 149 MORE THAN 2 NEUTRONS ON AN AVERAGE
    - 150 *attribution*
    - 151 FAST
      - 152 *explanation*
      - 153 HIGH-ENERGY
  - 154 *collection*
  - 155 ***MAINTAIN***
    - 156 agent
    - 157 ONE NEUTRON
    - 158 patient
    - 159 NUCLEAR CHAIN REACTION
    - 160 instrument
    - 161 FISSION
  - 162 ***LOST***
    - 163 patient
    - 164 SOME NEUTRONS
    - 165 *manner*
    - 166 NONPRODUCTIVELY
  - 167 ***TRANSMUTE***
    - 168 force
    - 169 NEUTRONS
      - 170 *specific*
      - 171 REMAINING NEUTRONS
    - 172 patient
    - 173 FERTILE ISOTOPES
      - 174 *constituency identification*
      - 175 HEAVY ELEMENTS
      - 176 *specific*
      - 177 *collection*
      - 178 THORIUM
        - 179 *specific*
        - 180 (THORIUM) 232
      - 181 URANIUM
        - 182 *specific*
        - 183 (URANIUM) 238
    - 184 latter
    - 185 FISSIONABLE ISOTOPES
      - 186 *specific*
      - 187 *collection*
      - 188 URANIUM
        - 189 *specific*
        - 190 (URANIUM) 233
      - 191 PLUTONIUM
        - 192 *specific*
        - 193 (PLUTONIUM) 239

ANTI S PROTEINS FOR SCHIZOPHRENICS

The need to change the abnormal behavior of adult schizophrenics along with improving their ability to process information is taking form as one of the major psychological and psychiatric problems that mental health workers must resolve in the near future. The Canadian Psychiatric Association has proclaimed that mental health workers must modify adult schizophrenics' abnormal behavior by the end of this century. This action would benefit the largest single proportion of hospitalized mental patients, two million schizophrenics. As for improving adult schizophrenics' ability to process information, it is hoped that these schizophrenics, who are usually not older than thirty years of age at initial hospitalization, will learn to pick out the relevant stimuli of a task, use the structure in materials, and use efficient learning strategies. It will take inhibition by adult schizophrenics in order for them to increase their use of relevant stimuli of a task, structure of materials and efficient learning strategies. Inhibition is produced by the ability to prevent the intrusion of responses that are not appropriate to the stimulus situation; that is, the ability to maintain a set. Unfortunately, inhibition tends to be defective in schizophrenics.

A related problem of equal magnitude is the treatment of children in the nation's mental hospitals with schizophrenia. They need to be treated for their lack of responsiveness, their unusual body movements and their inability to differentiate between self and others. The schizophrenic child has made an identification and fusion of himself with his mother, but he is unable to cope with the painful knowledge that he and his mother are separate entities. He is not like the autistic child that never becomes close to his mother after birth. Successful treatment of childhood schizophrenics would considerably reduce the total number of hospitalized mental patients from the ranks of patients classified as schizophrenic.

The anti-s-protein, an enzyme, holds great promise as the solution to these problems. Anti-s-proteins keep normal people sane. They are completely missing in the brains of adult and childhood schizophrenics, and this lack causes them to be mentally disturbed until the time when anti-s-proteins can be given to them. Proper doses could allow schizophrenics to function normally and return to society. It is in the light of these considerations that Dr. Gottlieb, Dr. Frohman, and Dr. Domino have mounted a concerted effort to develop the procedures whereby it will be possible to cure the nation's schizophrenics by 1998.

S-proteins are potent, unstable proteins called alpha-two-globulin. Anti-s-proteins control the production of the cork-screw shaped s-proteins. Cork-screw shaped s-proteins are abnormal proteins and are the only type of s-protein found in schizophrenics, while the s-proteins of normals are nearly all shaped like an accordion or a coil of string. The anti-s-proteins control the s-proteins by shutting off their production and preventing them from becoming abnormal. The anti-s-proteins could lessen the schizophrenic's confusion due to lack of the production of abnormal s-proteins, and dramatically curtail the schizophrenic's hallucinogenic factory in his brain. This delusion factory overproduces an essential amino acid for human metabolism, trytophan, and DMT, dimethyl tyrtamine. Thus, its use would result in a reduction in abnormalities in schizophrenics. It would reduce their abnormal behavior and information processing deficit. It would eliminate their unrealistic fears and attention to irrelevant stimuli.

It has been mentioned that anti-s-proteins keep normal people from thinking and behaving bizarrely. The effect of anti-s-proteins on a normal person calms him down after a crisis. It reduces the person's mental activities and alertness to a normal state. After a crisis anti-s-proteins inhibit a person's extreme sensitivity to all auditory stimuli and all visual stimuli. This is its effect on a person with normal amounts of anti-s-proteins. (Meyer, 1975a).

CONTENT STRUCTURE

Anti-s-proteins for Schizophrenics

TLS
1 2 3 4 5 6 7 8 LEVELS OF THE CONTENT STRUCTURE

1 *response*
2 *problem*
3 *collection*
4 NEED TO CHANGE ABNORMAL BEHAVIOR OR ADULT SCHIZOPHRENICS
5 *specific*
6 ***MUST MODIFY***
7 agent
8 MENTAL HEALTH WORKERS
9 patient
10 ADULT SCHIZOPHRENIC'S ABNORMAL BEHAVIOR
11 benefactive
12 ***IS LARGEST SINGLE PROPORTION OF HOSPITALIZED MENTAL PATIENTS***
13 patient
14 TWO MILLION SCHIZOPHRENICS
15 *setting time*
16 BY THE END OF THIS CENTURY
17 ***PROCLAIMED***
18 agent
19 CANADIAN PSYCHIATRIC ASSOCIATION
20 IMPROVE ADULT SCHIZOPHRENICS ABILITY TO PROCESS INFORMATION
21 *specific*
22 ***INCREASE USE***
23 agent
24 ADULT SCHIZOPHRENICS

```
25             attribution
26             USUALLY NOT ORDER THAN 30 AT INITIAL HOSPITALIZATION
27         patient
28         collection
29         RELEVANT STIMULI OF A TASK
30         STRUCTURE IN MATERIALS
31         EFFICIENT LEARNING STRATEGIES
32         latter
33         collection
34         PICKING OUT RELEVANT STIMULI OF A TASK
35         USE THE STRUCTURE IN MATERIALS
36         USING EFFICIENT LEARNING STRATEGIES
37         instrument
38         INHIBITION
39             attribution
40             TENDS TO BE DEFECTIVE IN SCHIZOPHRENICS
41             PRODUCED
42                 force
43                 ABILITY TO PREVENT INTRUSION OF RESPONSES THAT ARE NOT
                   APPROPRIATE TO THE STIMULUS SITUATION
44                     specific
45                     ABILITY TO MAINTAIN A SET
46 TREATMENT OF CHILDREN WITH SCHIZOPHRENIA
47     setting location
48     NATION'S MENTAL HOSPITALS
49     specific
50     collection
51     TREATMENT OF THEIR LACK OF RESPONSIVENESS
52     TREATMENT OF THEIR UNUSUAL BODY MOVEMENTS
53     TREATMENT OF THEIR INABILITY TO DIFFERENTIATE BETWEEN SELF AND OTHERS
54     explanation
55     CHILDHOOD SCHIZOPHRENIC MADE IDENTIFICATION & FUSION OF SELF WITH HIS
       MOTHER, BUT UNABLE TO COPE WITH KNOWLEDGE THAT HE & MOTHER ARE
       SEPARATE ENTITIES
56         adversative
57         AUTISTIC CHILD THAT NEVER BECAME CLOSE TO HIS MOTHER
58         setting time
59         AFTER BIRTH
60     SUCCESSFULLY TREAT
61         patient
62         CHILDHOOD SCHIZOPHRENICS
63         latter
64         REDUCE TOTAL NUMBER OF HOSPITALIZED MENTAL PATIENTS
65             manner
66             CONSIDERABLY
67             former
68             PATIENTS CLASSIFIED AS SCHIZOPHRENICS
69 solution
70 ANTI-S-PROTEIN
71     identification constituency
72     AN ENZYME
73     explanation
74     covariance, antecedent
75     collection
76     KEEP
```

77 patient
78 NORMAL PEOPLE
79 latter
80 SANE
81 *specific*
82 KEEPS NORMAL PEOPLE FROM THINKING AND BEHAVING BIZARRELY
83 *explanation*
84 CLAMS A NORMAL PERSON DOWN AFTER A CRISIS
85 *specific*
86 REDUCES THEIR MENTAL ACTIVITIES AND ALERTNESS TO A NORMAL STATE
87 *explanation*
88 ***CAUSES***
89 force
90 ANTI-S-PROTEINS
91 *setting time*
92 AFTER A CRISIS
93 latter
94 *collection*
95 INHIBIT A PERSON'S EXTREME SENSITIVITY TO ALL AUDITORY STIMULI
96 INHIBIT A PERSON'S EXTREME SENSITIVITY TO ALL VISUAL STIMULI
97 *attribution*
98 NORMAL AMOUNTS OF ANTI-S-PROTEINS
99 ***MISSING***
100 *manner*
101 COMPLETELY
102 patient
103 *collection*
104 *setting location*
105 BRAINS
106 ADULT SCHIZOPHRENICS
107 CHILDHOOD SCHIZOPHRENICS
108 latter
109 MENTALLY DISTURBED
110 *setting time*
111 UNTIL ANTI-S-PROTEINS CAN BE GIVEN TO THEM
112 ***GIVE PROPER DOSES***
113 latter
114 NORMAL FUNCTIONING OF SCHIZOPHRENICS
115 benefactive
116 SOCIETY
117 *covariance, consequent* (IN LIGHT OF THESE CONSIDERATIONS)
118 ***EFFORT MOUNTED***
119 agent
120 *collection*
121 DR. GOTTLIEB
122 DR. FROHMAN
123 DR. DOMINO
124 *manner*
125 CONCERTED
126 latter
127 ***CURE***
128 force

129 INJECTIONS OF ANTI-S-PROTEINS
130 patient
131 SCHIZOPHRENICS
132 range
133 NATION
134 *setting time*
135 1998
136 *attribution*
137 ***CONTROL***
138 force
139 ANTI-S-PROTEINS
140 patient
141 S-PROTEIN (PRODUCTION)
142 *explanation*
143 S-PROTEINS ARE POTENT, UNSTABLE PROTEINS
144 *specific*
145 ALPHA-TWO-GLOBULIN
146 latter
147 CONTROL OF THE PRODUCTION OF S-PROTEIN
148 *specific*
149 PREVENTS THE PROTEIN FROM GOING BAD AND SHUTS OFF ITS PRODUCTION
150 *attribution*
151 CORKSCREW SHAPED PROTEINS
152 *explanation*
153 CORKSCREW SHAPED PROTEINS ARE ABNORMAL PROTEINS AND THE ONLY KIND FOUND IN SCHIZOPHRENICS, WHILE PROTEINS IN NORMALS ARE MAINLY ACCORDIAN SHAPED OR COILED LIKE A STRING
154 *collection*
155 ***LESSENS CONFUSION***
156 agent
157 ANTI-S-PROTEINS
158 patient
159 SCHIZOPHRENIC
160 instrument
161 LACK OF ABNORMAL S-PROTEINS
162 ***CURTAILS***
163 patient
164 SCHIZOPHRENIC'S DELUSIONAL STATE
165 *manner*
166 DRAMATICALLY
167 ***STOPS***
168 force
169 ANTI-S-PROTEIN
170 *specific*
171 ANTI-SCHIZOPHRENIC OR STRESS PROTEIN
172 patient
173 SCHIZOPHRENIC'S HALLUCINOGENIC FACTORY
174 *constituency identification*
175 SCHIZOPHRENIC'S BRAIN
176 *specific*
177 *collection*
178 FACTORY OVERPRODUCING ESSENTIAL AMINO ACID FOR HUMAN METABOLISM

179 *specific*
180 THE AMINO ACID TYRTOPHAN
181 DMT FACTORY
182 *specific*
183 DIMETHYL TYRTAMINE
184 latter
185 REDUCTION IN ABNORMALITIES IN SCHIZOPHRENICS
186 *specific*
187 *collection*
188 REDUCTION IN ABNORMAL BEHAVIOR
189 *specific*
190 ELIMINATE THEIR UNREALISTIC FEARS
191 REDUCTION IN INFORMATION PROCESSING DEFICIT
192 *specific*
193 ELIMINATE THEIR ATTENDING TO IRRELEVANT STIMULI

Appendix B

Decision Rules and Procedures for Scoring and Grouping Immediate Free Recalls

The researcher followed Meyer's (1985) recommendations for scoring. Meyer states that the purpose for scoring (1985, p. 289) is to ascertain the subject's recall of the *meaning* the text is attempting to convey. This entails recall of topic content and recall of relationships in the text, in other words, both lexical and rhetorical predicates or idea units (see p. 9 this research). The content structure (see Appendix A) is used as the scoring key for the recall protocols. An idea unit is scored ***when it is present.***

The following guidelines (after Meyer) were used:

(1) verbatim recall of topic content was scored as present.

(2) substantive that is, substantially accurate, recall of topic content was scored as present. Meyer (1985, p. 289) states that substantive recall is "any reasonable paraphrase in terms of general meaning". Content units which were substantially accurate were scored as present whether or not they were recalled in correct relationship to other units. (See list of acceptable paraphrases for each text attached.)

(3) a role relationship was scored as present only when the lexical predicate dominating it was also scored; however, the topic content it related to the lexical predicate needed not be scored if it did not meet the requirements in either (1) or (2) above.

(4) lexical predicates, typically verbs, were scored much more loosely than other content words due to rule (3) (see list of acceptable paraphrases).

(5) rhetorical predicates were scored as present only if (a) the correct rhetorical relationship was signaled or implied in the protocol and (b) at least one of its arguments was scored as present in the protocol. For example, *covariance, consequent* was scored only when *covariance antecedent* was recalled. Thus, both were scored as present.

(6) response (the TLS in question) was scored only when both problem and solution were scored. Both had to be there.

SCORING PROCEDURES

The content structures of the 'Fast Breeder Reactors' and 'Anti S Proteins for Schizophrenics' text were written onto one quarter inch graph paper. Each idea unit was given a number. (There were 193 idea units in each of the two texts.) A correspondingly numbered sheet of graph paper, with one column allotted for each subject's recall was then lined up with the appropriate content structure. The sheets were paper clipped together.

Each recall was read from beginning to end, sentence by sentence. If exact words or a paraphrase appeared (rules 1 and 2 above), a number was placed in the box on the scoring sheet that corresponded to the idea unit recalled. This number indicated the order in which the idea unit was recalled. For example, for the first idea unit appearing in a recall, the number one was placed in the box beside that idea unit in the content structure. All repetitions, intrusions and misunderstandings were circled and ignored. The number of idea units recalled for each subject was totalled. The group to which the recall belonged (A, B, C or D) was also indicated.

SUGGESTED STEPS TO BE FOLLOWED BY THE SECOND SCORER

The researcher modeled the following steps for the second scorer:

(1) Read the recall protocol from beginning to end to get a feel for what is there.

(2) Reread the original text.

(3) Place the content structure in front of you.

(4) Reread the recall. Circle signals (see attached list) in green. Circle repetitions, intrusions and misunderstandings in red.

(5) Check recall for characteristics of groups A, B, C and D (see attached list). Decide into which group you would place it.

(6) Match the recalled information to the content structure using Meyer's guidelines. Move back and forth from the recall to the content structure. Check the list of acceptable paraphrases often.

(7) Verify the group and record.

(8) Total the number of ideas units and record.

RULES SPECIFIC TO THE TEXTS USED IN THIS RESEARCH

A. *Anti S Proteins for Schizophrenics*

1. Allow for French words and/or translations as subjects were told that they could use them if they were not sure of their English equivalents. The following language errors from French to English were scored as present:

- *leur manque de sensibilité:* sensitivity and sensibility as equivalents; credit idea unit 51 " treatment of their lack of responsiveness";
- *ont mis sur pied un programme*: have put their foot on a cure for; credit idea unit 118 "effort mounted";
- *psychophrenia* credited as schizophrenia;

2. Spelling mistakes in both English and French were ignored (e.g. instable for unstable protein, idea unit 143). There were no cases in which a spelling error hindered meaning.

3. Few subjects recalled the names of the three doctors involved. If they recalled "three Canadian doctors" or "the two scientists" or "researchers', collection and agent were scored (rules 3 and 5 above). If they recalled "Gottlieb et al.", collection and agent and the names Gottlieb, Frohman and Domino were also scored.

4. No subjects recalled both child and adult schizophrenics (idea units 106 + 107). In this case, adult schizophrenics was always scored.

ACCEPTABLE PARAPHRASES FOR IDEA UNITS

Meyer (1985, p. 26) stated: "you will always have to make generous rules for scoring substantive recall". A list of acceptable paraphrases follows. As this list was an open one, the researcher needed to return to previously scored recalls when another paraphrase was considered acceptable. The second scorer received the following list of paraphrases for:

idea unit

#4 NEED TO CHANGE ABNORMAL BEHAVIOR OF ADULT SCHIZOPHRENICS

- treatment of abnormal behavior in schizophrenics
- adults who have schizophrenia
- the behavior of adult schizophrenics
- the mental state of adult schizophrenics
- adult schizophrenics who have trouble being part of society

#6 MUST MODIFY

- facing
- must find a way
- must address
- must resolve
- must find
- in search of a cure

#12 IS LARGEST SINGLE PROPORTION OF HOSPITALIZED MENTAL PATIENTS

- a majority of mental health patients

#16 BY THE END OF THE CENTURY

- in the near future

#17 PROCLAIMED

- declared
- has placed a difficult task
- has estimated
- would like to find a cure or a good treatment
- has addressed
- is looking for ways

#20 IMPROVE ADULT SCHIZOPHRENIC'S ABILITY TO PROCESS INFORMATION

- their inability to deal with information
- they do not think normally

#22 INCREASE USE

- train
- must prove their inhibition
- to help them to respond
- have to find a special way
- to interest schizophrenics

#34 PICKING OUT THE RELEVANT STIMULI OF A TASK

- finding the stimulus and response
- learning to react to specific situations
- must find stimuli
- attach themselves to a 'tâche'

#35 USE THE STRUCTURE IN MATERIALS

- use logical thinking

#36 USING EFFICIENT LEARNING STRATEGIES

- attaining a learning method

#40 TENDS TO BE DEFECTIVE IN SCHIZOPHRENICS

- is at a lower level
- inhibitions are reduced in schizophrenics

#43 ABILITY TO PREVENT INTRUSION OF RESPONSES THAT ARE NOT APPROPRIATE TO THE STIMULI SITUATION

- they block out the rest

#46 TREATMENT OF CHILDREN WITH SCHIZOPHRENIA

- child schizophrenics who are hsopitalized
- treatment of child schizophrenics
- many afflicted are children
- children also suffer from schizophrenia

#51 TREATMENT OF THEIR LACK OF RESPONSIVENESS

- treatment of their lack of sensitivity, or sensibility
- unable to move
- cannot function mentally
- inability to decifer (sic) what is real

#52 TREATMENT OF THEIR UNUSUAL BODY MOVEMENTS

- their dislocated body movements
- no co-ordination
- can't control their bodies

#53 TREATMENT OF THEIR INABILITY TO DIFFERENTIATE BETWEEN SELF AND OTHERS

- inability to find their own identity
- trouble with their personal identity

#70 ANTI-S PROTEIN
- anti-s drug
- anti-s formula
- amino-s

#76 KEEP
- can help
- conserves
- is present

#84 CALMS A NORMAL PERSON DOWN AFTER A CRISIS
- able to react sensibly

#99 MISSING
- does not exist
- is not present
- lack this enzyme
- is not produced

#109 MENTALLY DISTURBED
- to have abnormalities

#112 GIVE PROPER DOSES
- treat patients
- introduce the anti-s protein into schizophrenics
- in careful, controlled amounts

#114 NORMAL FUNCTIONING OF SCHIZOPHRENICS
- to control their behavior

#118 EFFORT MOUNTED
- is being developed
- have put on the ground
- research and development of the cure
- have been working on
- have put such a program under way
- set up a program
- hoping to find
- have discovered
- are trying to get permission

#127 CURE

- a project which will produce
- eliminate schizophrenia
- minimize the number of schizophrenics
- hope to have made significant changes

#135 1998

- 2000
- in a few years
- by the late 90's

#137 CONTROL

- halts the development
- slows (down)
- regulates (the sanity)
- fights
- battles
- reduces
- prevents (over-concentration of protein-s)
- inhibits production
- counters the effects of
- counteracts with s agents

#149 PREVENTS THE PROTEIN FROM GOING BAD

- causes a jam up of s proteins
- hinders abnormal brain activity

#162 CURTAIL

- reduce
- diminish
- can be used to treat schizophrenia
- relaxing formula

#167 STOP

- prevents
- block

#175 SCHIZOPHRENIC'S BRAIN

- in the system of the patients
- in their bodies
- hallucinations which are current

#185 REDUCTION IN ABNORMALITIES IN SCHIZOPHRENICS

- enable them to distinguish and organize mental information so they can react appropriately
- behavior will become more normal
- regulate behavior
- modify behavior

B. *Fast Breeder Reactors*

1. Allow for French words and/or translations as subjects were told they could use them if they were not sure of their English equivalents. The following language errors from French to English were scored as present:

- *charbon* was often translated as carbon, and this was scored for idea unit 51," coal".
- *des milliers d'années* was often translated as millions of years and this was scored as present for "thousands of years", idea unit 111.
- *thorium* was often translated as thonium, trillium and titronium and these were all scored as present for "thorium", idea unit 107.
- *neutrons* was often translated as nurons and neurons and both were scored as present for "neutrons", idea units 147 and 157.

2. Spelling mistakes in both English and French were ignored (e.g. fision, fussion and fusion were all scored for "fission", idea unit 161). There were no cases in which a spelling error hindered meaning.

3. When subjects mentioned 1600 kilowatts and 300 kilowatts, these were considered incorrect and were not scored.

4. When the atomic number for uranium, for example, was incorrect, a subject received a score for uranium (181) but not for ***description: specific*** (182) nor for the mention of the wrong atomic number (183).

5. Gasoline, petrol and petroleum were all scored for "oil", idea unit 52.

6. Few students mentioned "low-grade thorium ore" (107) or "low-grade uranium ore" (106) but mentioned thorium and uranium. These were scored as correct.

ACCEPTABLE PARAPHRASES FOR IDEA UNITS

idea unit

#4 NEED TO GENERATE ELECTRIC POWER

- enormous amounts of energy being used
- desire to create electrical energy
- energy shortage
- lack of energy production
- electric production
- overconsumption of electrical energy

#6 ADD

- that we will need
- increase
- use

#12 ITS PRESENT CAPACITY

- required

#16 NEXT 30 YEARS

- in the near future
- in the years to come

#17 ESTIMATED

- identified
- says
- found
- discovered
- to solve the problem
- they feel that

#19 FEDERAL POWER COMMISSION

- national energy commission
- Canadian Energy Board
- Canadian Energy Association

#20 PROTECT THE ENVIRONMENT

- environmental issues
- pollution of environment
- pollution (of air) (of air, water and land)
- save environment
- they take up a lot of natural substances
- dangers to environment
- effects on environment

#22 IMPROVE QUALITY

- to purify the air, water
- interested in purifying

#31 LANDSCAPE

- fields

#41 RUN

- to satisfy
- to produce such things

#46 RATIONAL UTILIZATION OF FINITE RESERVES

- natural resources must be used effectively
- declining availability and environmental effects
- conserve finite resources
- natural gas, petrol and carbon reserves are limited
- natural reserves
- running out
- use of natural resources
- use and supply of natural energy and its limits

#55 SOURCES OF ORGANIC MOLECULES

- sources of energy
- organic content

#60 REDUCE CONSUMPTION

- conserve energy
- consuming these also pollutes the air

#70 BREEDER REACTORS

- nuclear energy generators
- regenerating reactors
- nuclear power
- (use of) nuclear energy
- new source of energy

#99 USE

- can offer use
- the elements required
- derives
- they run on
- will minimize
- we have
- is obtained

#105 DISPERSED IN ROCKS OF THE EARTH

- found in rocks
- trapped in rocks

#118 EFFORT MOUNTED

- the creation of such a reactor
- have put on its feet
- hopes to have
- is being addressed
- foundation of
- started a program
- have tried to resolve
- working on developing the technology to create
- has done research
- research is being done
- are developing

#127 GENERATE

- produce
- to produce electric energy
- to put the production of energy

#133 COMMERCIAL SCALE

- by all major energy companies of Canada
- in commercial use

#135 IN 1994

- in the near future
- by the 90's

#147 LIBERATES NEUTRONS

- releases
- produces
- emits
- freed

#155 MAINTAIN

- can be used in another fission reaction
- attaches onto a chain
- one atom is responsible
- produce

#162 LOST

- can be redirected into another reactor

#167 TRANSMUTE

- transformed from one form to another
- transform
- turn into
- split
- converted to

CHARACTERISTICS OF GROUPS A, B, C AND D FOR SCORING PROCEDURES

(adapted from Meyer, 1985, p. 291)

1. signaled problem and solution and organized in problem solution TLS.
2. signaled only solution and organized in problem solution TLS.
3. signaled only problem and organized in problem solution TLS.

scored as **response**, the use of problem solution TLS

Group A

---

4. no signal words for either problem or solution, but problem solution TLS is implicit and recall protocol is organized in problem solution TLS.

Group B

---

5. organized with another TLS that is, causation or comparison but problem or solution is stated in one or two sentences; few or no signal words for problem or solution.
6. organized as a collection of descriptions but problem or solution is stated in one or two sentences; few or no signal words for problem or solution.

Group C

---

7. organized with another TLS that is, causation or comparison and no mention of problem or solution; no signal words for problem or solution but some or no signal words for the TLS used.
8. organized as a collection of descriptions and no mention of problem or solution; no signal words for problem or solution but some or no signal words for description.
9. random list with no association for grouping; no signal words whatsoever.

Group D

SIGNALS FOR PROBLEM SOLUTION

Problem: problem, question, perplexity, puzzle, enigma, riddle, issue, query, need, to prevent the trouble; remark.

Solution: solution, answer, response, reply, rejoinder, return, comeback, to satisfy the problem, to solve the problem, to set the issue at rest, to solve these problems, the answer to this crisis, they came up with, X is one place to turn, the accepted way, a new way, the way of the future, trying to find a way, to help to deal with, they are looking to, thank God for; in order to find.

(adapted from Meyer, 1982, p. 78; signal words found in subjects' recalls in this study were added to the above list.)

Appendix C

Course Equivalencies for FLS 1704

University	Course Code	Date
ALBERTA	FREN 408	4.2.87
BISHOP	FRAN 202B	4.2.87
BRITISH COLUMBIA	302	8.4.88
CALGARY	FRENCH 420	4.2.87
CARLETON	FRENCH 20.109	7.6.88
CARLETON	FRENCH 20.111	7.6.88
LAVAL	FNF 14075/6/7	22.12.88
LAVAL	FNF 14609	4.2.87
LAVAL	FNF 16051/56	16.8.88
LAVAL	FNF 16893	4.2.87
McGILL	127-303B	26.5.87
McGILL	127-403A B	26.5.87
McMASTER	FRENCH 203	4.2.87
MONTON	FL 2522	4.2.87
NEW BRUNSWICK	FREN 4034	4.2.87
NEW BRUNSWICK	FREN 4232	4.2.87
QUEEN'S	FREN 110	4.2.87
SIMON FRASER	FREN 300-3	8.4.88
SORBONNE	CERT.LG.FRAN.	22.12.88
ST-MARY'S	FR250.0	4.2.87
STE-ANNE	FRA 1063	27.3.87
STE-ANNE	FRA 1143	27.3.87
STE-ANNE	FRA 1413	27.3.87
TORONTO	FRE 26 1Y	4.2.87
TORONTO	FRE 27 1Y	4.2.87
U.Q.A.C.	7FRA 603	4.2.87
U.Q.A.C.	7FRA 604	4.2.87
U.Q.T.R.	FRS 1020	4.2.87
U.Q.T.R.	FRS 1021	4.2.87
U. CAN EN FRANCE	FREN 3115F	24.6.88
VICTORIA	FREN 402	29.4.87
WATERLOO	FR 193	4.2.87
WATERLOO	FR 208	4.2.87
WESTERN	FRENCH 141	4.2.87
WESTERN	FRENCH 271	22.2.89
WESTERN	FRENCH 381	27.10.88
WINDSOR	29-221	4.2.87
WINDSOR	29-222	4.2.87
YORK	AS/FR 206.3	15.7.87
YORK	AS/FR 2080.06	4.2.87

Appendix D

Statistics for the Second Language Reading Test

SUBTEST 4 – *Mensa*

	(D)	(V)
item 1	.52	.39
item 2	.55	.45
item 3	.45	.18
item 4	.34	.34

SUBTEST 5 – *Le Boomerang*

	(D)	(V)
item 1	.83	.20
item 2	.65	.31
item 3	.48	.29
item 4	.76	.27
item 5	.47	.41

SUBTEST 6 – *Qu'est-ce qui fait un gagneur*

	(D)	(V)
item 1	.41	.39
item 2	.71	.29
item 3	.78	.20
item 4	.34	.28
item 5	.64	.34
item 6	.36	.23

SUBTEST 7 RATIONAL CLOZE – *Le Musée Dostoievski à Léningrad*

	(D)	(V)
item 1	.74	.23
item 2	.85	.21
item 3	.68	.37
item 4	.63	.26
item 5	.90	.17
item 6	.60	.34
item 7	.86	.24
item 8	.88	.21
item 9	.90	.18
item 10	.74	.33
item 11	.67	.11
item 12	.68	.45

	(D)	(V)
item 13	.45	.54
item 14	.70	.38
item 15	.72	.38
item 16	.44	.54
item 17	.77	.24
item 18	.88	.14
item 19	.79	.31
item 20	.68	.46
item 21	.57	.54
item 22	.87	.16
item 23	.80	.31
item 24	.74	.35
item 25	.49	.42
item 26	.64	.42
item 27	.72	.36
item 28	.64	.42
item 29	.71	.42
item 30	.73	.37

Appendix E

Booklet

COVER SHEET FOR RESEARCH MATERIALS – Part I

Name____

Student number______________________________________

Classroom teacher____________________________________

Course____

Year at university____________________________________

Sex____

Age____

Date____

Address____

____

____

S.I.N.____

COVER SHEET FOR RESEARCH MATERIALS – Part II

Please follow along as I read the instructions aloud.

This is part of a study designed to examine factors that influence reading in a second language. Today you will be asked to read a text in **French** and to write down in **English** all that you can remember from this text. You are to suppose that this text was information presented in a class and that a classmate was absent when this information was presented. Since you are both going to be examined on this information, you are going to go over all of it with your classmate afterwards. You will thus require all the information that you can remember from the text.

This booklet contains a reading selection in French, a questionnaire for your assessment of the text and paper for the remembering task. A yellow envelope has also been provided.

You will be expected to read your text at your usual reading rate. You will be examined on the content of the passage without the text in front of you afterwards. You will record your reading time at both the beginning and the end of the passage on the lines provided. Although you are asked to record your reading time, this is not a test of speed. We simply want to get an idea of the amount of time that is required to read each text that we are looking at in this experiment. Do not worry about how fast other students are working as you have different texts to read.

There is a clock at the front of the room. When you have finished reading the text, you will look up at the clock and record your reading time. Then place the text in the yellow envelope. You will do the assessment task which follows. Next you will write down all that you can remember from the text you read.

READER ASSESSMENT OF TEXT

Circle the number that best answers the question. Circle one number for each question.

1. *How difficult was this text for you to read and understand?*

very difficult	somewhat difficult	of average difficult	not too difficult	easy
1	2	3	4	5

2. *How difficult do you think this text will be for you to remember?*

very difficult	somewhat difficult	of average difficult	not too difficult	easy
1	2	3	4	5

3. *What are your feelings regarding the content of this text?*

strong disagreement	disagreement	neutral	agreement	strong agreement
1	2	3	4	5

4. *How interesting did you find this text to read?*

totally uninteresting	somewhat interesting	interesting	quite interesting	very interesting
1	2	3	4	5

5. *How much background knowledge do you think you had in this subject area?*

very little	some	an average amount	a fair amount	quite a lot
1	2	3	4	5

6. *How clear was the main line of thought or the main argument of the text?*

unclear	somewhat clear	moderately clear	mostly clear	very clear
1	2	3	4	5

7. *How organized do you think the text was that you read?*

unorganized	somewhat organized	moderately organized	mostly organized	very organized
1	2	3	4	5

8. *Would you recommend this text to a classmate?*

strong disagreement	disagreement	neutral	agreement	strong agreement
1	2	3	4	5

9. *Would you like to read another text like this one on the same subject?*

strong disagreement	disagreement	neutral	agreement	strong agreement
1	2	3	4	5

10. *Would you be interested in discussing the content of this text?*

strong disagreement	disagreement	neutral	neutral	strong agreement
1	2	3	4	5

Le temps au début de la lecture:

LES RÉACTEURS RÉGÉNERATEURS

La production d'énormes quantités d'énergie électrique additionnelles aussi bien que la protection de l'environnement figurent au nombre des problèmes majeurs, sociaux et technologiques que la société devra résoudre pendant les prochaines années. La Commission Fédérale de l'Énergie a estimé que pendant les 30 prochaines années, l'industrie canadienne de l'énergie doit produire un surplus de 1 600 millions de kilowatts qui doit alors s'ajouter à sa production actuelle de 300 millions de kilowatts d'énergie électrique. En ce qui concerne l'environnement, l'importance accordée à l'amélioration de la qualité de l'air, de l'eau et du paysage n'a plus besoin d'être remise en question, par contre, le problème suivant est rarement pris en considération: il faudrait énormément d'énergie électrique pour satisfaire aux besoins de différentes sortes d'installations pour l'épuration, celles-ci étant nécessaires pour épurer l'air et l'eau, ainsi que pour recycler les déchets.

Un problème relié à celui dont nous venons de parler, mais qui n'est pas moins important est l'utilisation rationnelle des réserves nationales et limitées, comme par exemple, le charbon, le pétrole et le gaz naturel. À long terme, ces réserves deviendront plus précieuses comme sources de molécules organiques plutôt que comme sources de chaleur. De plus, en réduisant la consommation de ces combustibles organiques on diminue du même coup le degré de pollution de l'air qui est dû aux produits de cette combustion.

Grâce au type «régénerateur» de réacteur nucléaire, on espère trouver une solution à ces problèmes. Les réacteurs régénerateurs produisent plus de combustible nucléaire qu'ils n'en consomment, et ils permettent d'utiliser comme source d'énergie à prix modique, pendant des milliers d'années, les énormes quantités d'uranium et de thorium de faible teneur que l'on retrouve dans les roches. De plus, ces réacteurs pourraient fonctionner sans déverser dans l'air les produits nocifs de la combustion. C'est en se fondant sur ces faits que la Commission de l'Énergie Atomique, l'industrie nucléaire et les compagnies d'électricité ont mis sur pied un programme élaboré pour développer la technologie nécessaire pour créer un réacteur régénerateur qui produira de l'énergie électrique sur une base commerciale d'ici les années 94.

On sait que l'énergie nucléaire est produite à partir de neutrons qui sont libérés au cours de la fission nucléaire. La fission de chaque atome d'un combustible nucléaire tel que l'uranium 235, libère en moyenne deux neutrons rapides (à haute énergie). Un de ces neutrons permet alors de déclencher une nouvelle fission qui prolonge la réaction nucléaire en chaîne. Si certains de ces neutrons sont perdus au cours de l'opération, cela ne ralentit pas toutefois la production d'énergie nucléaire, et les atomes qui restent sont alors disponibles pour permettre de produire d'autres atomes nécessaires pour la fission, c'est-à-dire, pour transformer les isotopes appartenants aux éléments lourds en isotopes nécessaires pour la fission. Les matières premières utilisables pour les réactions régéneratrices sont le thorium 232, qui est transformé en uranium 233, et l'uranium 238, qui est transformé en plutonium 239.

On sait que la reproduction nucléaire a lieu quand on obtient plus de matière fissible que l'on n'en consomme, et cette condition se trouve réalisée grâce au temps de doublage que l'on définit ainsi: le temps nécessaire pour produire la même quantité de matériaux fissibles que celle que l'on retrouve au début de l'expérience dans le réacteur. À la fin du temps de doublage, le réacteur aura produit assez de matériel fissible pour se régénerer et également pour alimenter un autre réacteur identique. Un réacteur régénerateur efficace aura un temps de doublage d'environ 7 à 10 ans.

Minutes: secondes:
Votre temps de lecture

Le temps au début de la lecture:

LES PROTÉINES ANTI-S POUR SCHIZOPHRÈNES

Le comportement anormal des adultes schizophrènes aussi bien que les difficultés qu'ils éprouvent dans le traitement de l'information figurent au nombre des problèmes que les travailleurs en santé mentale devront résoudre dans un avenir proche. L'association canadienne de psychiatrie a déclaré que les travailleurs en santé mentale devront trouver des solutions pour modifier le comportement anormal d'adultes schizophrènes d'ici la fin du siècle. La plus grande proportion de patients psychiatriques hospitalisés, c'est-à-dire, deux millions de schizophrènes, pourraient ainsi profiter de ces études. En ce qui concerne la façon d'améliorer l'habilité des adultes schizophrènes à traiter l'information, il faut espérer que ces individus, qui sont dans la trentaine lors de leur hospitalisation initiale, pourront apprendre à sélectionner les stimuli propres à une tâche spécifique, le cadre de réference approprié ainsi que des stratégies d'apprentissage efficaces. Pour ce faire, ces adultes schizophrènes devront faire preuve d'un certain degré d'inhibition qui leur permettra alors d'utiliser plus fréquemment des stimuli reliés à une tâche particulière, le cadre de réference convenable et les stratégies d'apprentisage efficaces. On sait que l'inhibition se produit lorsqu'on élimine les réponses qui ne sont pas appropriées aux stimuli que l'on reçoit, c'est-à-dire, lorsqu'on parvient à maintenir un ensemble cohérent. Malheureusement, l'inhibition existe à un niveau réduit chez les schizophrènes.

Un problème relié à celui dont nous venons de parler, mais qui n'est pas moins important, est le traitement des enfants schizophrènes dans les hôpitaux pyschiatriques. Ils ont besoin d'être traités pour leur manque de sensibilité, leur mouvements corporels désordonnés et leur incapacité d'acquérir leur propre identité. L'enfant schizophrène s'identifie à la mère, mais il est incapable de faire face à la pénible réalité que lui et la mère sont deux entités distinctes. Il ne ressemble en rien à l'enfant autistique qui, lui, ne se rapproche jamais de la mère après la naisance. Si l'on arrivait à mettre au point un traitement pour ces enfants, cela réduirait considérablement le nombre total de malades hospitalisés classifiés comme schizophrènes.

Grâce à la protéine anti-S, un enzyme, on espère trouver une solution à ces problèmes, ces protéines anti-S aidant les gens à conserver leur santé mentale. On sait que ces substances sont absentes dans le cerveau des schizophrènes, et cela cause des désordres mentaux qui peuvent être traités par l'administration de ces protéines. Des doses appropriées de protéines pourraient permettre aux schizophrènes de fonctionner normalement et de mieux s'intégrer à la société. Pour que ces conditions soient réalisables, les docteurs Gottlieb, Frohman et

Domino ont mis sur pied un programme spécial qui permettra de produire les protéines nécessaires pour traiter tous les schizohprènes d'ici les années 98.

Les protéines anti-S sont des protéines puissantes et instables appelées alpha-deux-globulin. Les protéines anti-S contrôlent la production des protéines-S, qui sont en forme de tire bouchon. Ces protéines-S en forme de tire bouchon sont des productions anormales et se trouvent uniquement chez les schizophrènes, tandis que chez les gens normaux presque toutes les protéines-S sont en forme d'accordéon ou de ressort. Les protéines anti-S empêchent la formation des protéines-S et préviennent ainsi les anormalités. Chez les schizophrènes les protéines anti-S pourraient avoir un effet bénéfique en réduisant le nombre de protéines-S anormales et de cette façon faire diminuer dramatiquement le nombre d'hallucinations. Les protéines anti-S, 'S' signifiant schizophrène ou stress, pourraient faire cesser cet état d'hallucinations que l'on retrouve dans les cervaux des schizophrènes. L'état d'hallucinations est responsable d'une surproduction d'un acide aminé essentiel au métabolisme, le trytophan ainsi que le DMT, le diméthyl tyrtamine. Un surplus de trytophan ainsi que de DMT est produit pendant les états d'hallucinations. Ainsi l'utilisation de la protéine anti-S régulariserait le comportement des schizophrènes, elle modifierait leur comportement et aiderait à résoudre leur problème de traitement de l'information, tout en éliminant les craintes qui ne sont pas fondées et leur attention pourrait ainsi se porter sur les stimuli pertinents.

On sait que les protéines anti-S empêchent les gens normaux de penser et de se comporter de façon anormale. Les protéines anti-S chez ces gens-là agissent comme calmant après un état de crise en réduisant à un état raisonnable l'activité mentale ainsi que la sensibilité. Une personne qui possède un taux normal de protéines anti-S réagit bien mieux, car ces protéines anti-S empêchent alors une sensibilité extrême à tous les stimuli auditifs aussi bien que visuels.

Minutes: secondes:
Votre temps de lecture

RECALL SHEET

Use the space below to write down in **English** all that you can remember from the text without looking back at it. Use complete sentences and paragraphs. Do not just list words. You may use words that you remember from the text or your own words. Remember that your classmate was not in class and needs all the information about this particular

text that you can remember. If you do not know the English equivalent for a French word, then use the French word in your recall. When you have finished writing down what you can remember, record your writing time at the end on the line provided. Again, this is not a test of speed. We simply want to get an idea of the amount of time you needed to write down what you remember.

Minutes: Seconds:
Writing time:

Appendix F

Livret de l'étudiant X

Appendix G

Livret de l'étudiant C

Appendix H

Instructions for Professor of Control Group

Cher Professeur,

Merci d'avoir accepté de prendre part à l'expérimentation pour ma thèse. J'aimerais te rencontrer dès janvier 1990 pour te donner de plus amples renseignements à ce sujet ainsi que le matériel requis. En attendant, voici un petit calendrier des événements.

Au début du cours 1704: C'est à toi d'annoncer aux élèves que leur groupe a été choisi pour participer à un projet de lecture en FLS au mois de février. À cette époque, une assistante (moi) viendra leur faire passer des tests. Après, ils auront un livret spécialement préparé pour eux pour leur aider à travailler leur lecture en FLS. Les étudiants seront payés pour leur participation à ce projet à condition d'y rester jusqu'à la fin. Je confirmerai le montant plus tard. Il serait bon que leur travail avec le livret compte dans la note finale.

Les pré-tests se donneront lundi le 5 février: une assistante viendra donner le test de compétence (partie compréhension de l'écrit seulement). Les élèves auront aussi à lire un texte et à se rappeler ce même texte par écrit après. Ta présence est bienvenue.

Les 6, 7, 12, 13 et 14 février: Tu dois travailler dans le livret avec tes élèves pendant une heure par session, pour un total de 5 heures de lecture en tout. Le but est d'exposer ces élèves aux textes dans le livret à travers leurs idées principales et leurs tons ainsi qu'à travers les opinions et les connaissances antérieures des élèves etc. Le livret est le même que dans l'autre cours 1704. Ton rôle est expliqué dans le livret du professeur. Enfin, tu enseignes la lecture comme dans n'importe quelle classe de langue seconde qui porte sur les quatre habiletés.

Le post-test se donnera le 12 mars: une assistante (moi) viendra et les élèves auront à lire et à se rappeler un texte par écrit après. Ta présence est bienvenue.

Je compte te voir bientôt. Je pense qu'une fois le livret en main, tu verras mieux ce qu'il faut faire. Merci d'avance.

Bien à toi,

Cher Professeur,

Voici la copie du livret de lecture. Tes étudiants auront ce même livret (sans les questions). Tu remarqueras certaines choses. D'abord, ce sont des textes authentiques, c'est-à-dire pas écrits spécialement pour des étudiants en langue seconde. Secondly, this booklet has been organized to provide a conventional study procedure, question answering.

Chapter 1 contains mostly factual questions on each text. The students can readily find the answers in the texts themselves. Sometimes, they are required to use their own experience to answer the questions. You might want to use the Request Procedure.* You should ask students to recall texts periodically, especially the longer texts.

Chapter 2 introduces the dyad (2 by 2). The students will work in groups of two and you can assign several questions to each dyad. These questions are more specific than those in chapter 1, but again, the answers can readily be found in the texts themselves. When the students write down the answers to these questions, these answers should not be graded.

Chapter 3 continues the dyad and introduces inferencing questions, that is, those whose answers are to be inferred from the texts. There are also some questions on the tone of some texts. The students should be asked to recall longer texts.

Chapter 4 has the students working individually and using questions as part of their prereading, that is, they are to read a given text with a particular purpose in mind which is, in fact, what natives do. These texts are longer and the students should be required to recall these texts periodically.

You can, of course, add some of your own questions to those already included in the list. You can use the grammatical and orthographic features of the texts in the booklet if you so choose. You can also pick and choose those texts that you prefer to work with since you will probably not have time to do all the texts in each chapter. You are not, however, to approach these texts from a global or structural point of view at any time.

I am, at your disposal for any clarifications and suggestions if need be.

Bien à toi

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* For the Request Procedure see, A.V. Manzo, "The Request Procedure", 1969, *Journal of Reading*, 13, pp. 123-126. Or you can simply ask me.

Appendix I

Matrix of Significant Correlations for All Variables for the Fast Breeder Reactors Text

TABLE XIV
Matrix of Significant Correlations for the Fast Breeder Reactors Text

	REC	RT	WT	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10
recall (REC)		–[a]	60[b]***	36*	53**	–	36*	–	35	–	–	34	36*
reading time (RT)	58**		–	32[c]	–	–	–	–	–	–	–	–	–
writing time (WT)	47*	–		–	36*	64**	64**	43*	39*	–	45*	42*	62**
Likert 1 (L1) (difficulty)	32	–	–		40*	34	58**	69***	35	–	46*	62**	42*
Likert 2 (L2) (memorability)	–	–	–	77***		–	58**	–	–	33	70***	58**	55**
Likert 3 (L3) (affect)	35*	42*	42*	–	–		52**	46*	–	–	–	35*	46*
Likert 4 (L4) (interest)	–	–	53**	–	37*	71***		60**	–	–	77***	78***	60**
Likert 5 (L5) (back. know.)	–	–	–	–	–	–	32		–	–	40*	43*	38*
Likert 6 (L6) (clarity of argu.)	–	–	50*	–	45*	–	–	–		47*	–	–	32
Likert 7 (L7) (organiz.)	–	–	53**	–	55**	32	45*	–	62**		35*	39*	–
Likert 8 (L8) (recommen.)	–	42*	59**	–	–	42*	65**	–	47*	47*		81***	62**
Likert 9 (L9) (content)	–	–	38*	–	36*	55**	74***	–	–	37*	58**		58**
Likert 10 (L10) (discussion of content)	36*	–	32	–	–	51*	66**	–	–	–	47*	72***	

Note: UPPER DIAGONAL FOR PRETEST, LOWER DIAGONAL FOR POSTTEST

[a] correlations of 3 and below are represented in this manner

[b] to be read as two decimal places

[c] negative correlations are underlined

*stands for $p < .05$

**stands for $p < .01$

***stands for $p < .001$

Appendix J

Matrix of Significant Correlations for All Variables for the Schizophrenics Text

TABLE XV
Matrix of Significant Correlations for the Schizophrenics Text

	REC	RT	WT	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10
recall (REC)		–^{a}	46^{b*}	–	–	–	–	$\underline{38}^{**c}$	44*	–	–	–	–
reading time (RT)	57**		–	–	–	–	–	–	–	–	–	–	–
writing time (WT)	64*	–		–	–	–	–	–	–	$\underline{40}^{*}$	–	–	–
Likert 1 (L1) (difficulty)	–	–	–		46*	39*	–	–	–	–	–	–	–
Likert 2 (L2) (memorability)	–	–	–	34		36*	43*	–	–	–	–	–	41*
Likert 3 (L3) (affect)	–	$\underline{46}^{*}$	–	46*	–		64**	57**	–	–	53**	54**	–
Likert 4 (L4) (interest)	–	–	–	–	50**	35*		63**	50**	–	57**	71***	58**
Likert 5 (L5) (back. know.)	–	–	–	37*	34	46*	58**		–	–	52**	52**	–
Likert 6 (L6) (clarity of argu.)	–	–	–	–	–	–	50**	–		–	–	–	–
Likert 7 (L7) (organiz.)	–	–	–	–	–	–	–	–	69***		54**	37*	–
Likert 8 (L8) (recommen.)	–	–	–	–	–	32	58**	39*	–	–		73***	32
Likert 9 (L9) (content)	–	–	–	–	–	–	61**	47*	–	–	64**		39*
Likert 10 (L10) (discussion of content)	–	–	–	35*	34	56**	37*	35*	–	–	40*	60**	

Note: UPPER DIAGONAL FOR PRETEST; LOWER DIAGONAL FOR POSTTEST.

[a] correlations of .31 and below are represented in this manner

[b] to be read as two decimal places

[c] negative correlations are underlined

*stands for $p < .05$

**stands for $p < .01$

***stands for $p < .001$

Existe-t-il une relation entre les effets de l'enseignement d'une stratégie de lecture et la quantité d'information rappelée? L'auteure du présent ouvrage essaie de répondre à cette question en soumettant à l'expérience l'enseignement d'une stratégie de lecture qui met l'accent sur l'organisation rhétorique des textes informatifs en français langue seconde.

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